

Collaborative composition and socially constructed instruments: Ensemble laptop performance through the lens of ethnography

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ABSTRACT

In this paper, we argue that the design of New Interfaces for Musical Expression has much to gain from the study of interaction in ensemble laptop performance contexts using ethnographic techniques. Inspired by recent third-stream research in the field of human computer interaction, we describe a recent ethnomethodologically-informed study of the Birmingham Laptop Ensemble (BiLE), and detail our approach to thick description of the group's working practices. Initial formal analysis of this material sheds light on the fluidity of composer, performer and designer roles within the ensemble and shows how confluences of these roles constitute member's differing viewpoints. We go on to draw out a number of strands of interaction that highlight the essentially complex, socially constructed and value driven nature of the group's practice and conclude by reviewing the implications of these factors on the design of software tools for laptop ensembles.

Keywords

Laptop Performance, Ethnography, Ethnomethodology, Human Computer Interaction.

1. INTRODUCTION

Historically, ethnographic research methods have been valued for their potential to highlight the complex, socially constructed nature of interaction, such as when considering how particular musical communities of practice operate [1]. This contribution has been summed up as "the demonstration that culture can be viewed from 'inside' its arrangements and relationships" [2]. More recently, as technology increasingly pervades existing forms of collaborative and artistic practice, ethnography is being harnessed to evaluate the social use of technology, and the results used to inform design. Harrison et al have identified a number of these studies as constitutive of a third paradigm in human-computer interaction (HCI) research, which they have labeled *situated perspectives* [3]. This term emphasises the value of ethnography as a lens through which to view the differing perspectives of participants in specific contexts. The work of Crabtree et al [4] provides a concrete example of this, where ethnography is employed to evaluate a range of ubiquitous computing environments of the authors' own design. Such systems lie at the confluence of social, technological and value-centered imperatives, where collaboration is mediated by devices and takes place in part over networks. In this paper, we turn our attention to a comparable context, that of cooperative musical performance using laptop computers.

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1.1 Ethnography in the Context of Laptop Ensemble Practice

Ensemble laptop performance is a growing field, which actively demonstrates the value of pragmatic, practice-led research. Recent approaches have focused on improvised live coding over local area networks [5], development of middleware solutions to manage changeover between compositions [6] and the pedagogical value of large-scale ensembles [7]. Although we see these activities as appropriate, we argue that there is also a need to move beyond the perspectives of individual ensembles – which are often characterised by the voices of their directors – to address broader issues of how technology is used in social contexts. In what follows, we argue that ethnography has the potential to further illuminate these issues. The value of the ethnographer is not simply his or her subjective standpoint, although this should be acknowledged, but is rather their ability to document, characterise and synthesise the differing perspectives of those involved.

With the above concerns in mind, we present some initial efforts to examine the working practices of the Birmingham Laptop Ensemble using ethnographic methods. Through the formal analysis of data gathered during rehearsal, we identify a number of threads of complex socially constructed interaction and reflect on their implications for design.

2. AN ETHNOGRAPHY OF THE BIRMINGHAM LAPTOP ORCHESTRA

2.1 Characterising The Ensemble

The Birmingham Laptop Ensemble¹ was formed in January 2011 by a group of postgraduate composers and performers working within the Music Department and Electroacoustic Music Studios at the University of Birmingham. At the time of writing, the line-up consists of Shelly Knotts, Charles Hutchins, Julien Guillamat, Norah Lorway, Christopher Tarren, Iain Anderson and Antonio Roberts. In their first year the group has performed both nationally and internationally in both club and concert hall contexts and their activities have recently come to wider prominence in the popular press [8].

The overall approach of the group can be summed up as consensus driven, stemming from a desire to perform together on an equal footing. In this respect the group share similar concerns with pioneering groups such as the The Hub [9]. This is in contrast to more formally hierarchical or pedagogically oriented approaches, such as those proposed by the Laptop Orchestra (or LOrk) model [7], which have become widely adopted in recent years². Taking their cue from the approach of

¹ <http://www.bilensemble.co.uk/>

² See recent groups such as the Boulder Laptop Orchestra and the Laptop Orchestra of Louisiana

the Huddersfield Experimental Laptop Orchestra [10], BiLE prioritise musical or artistic ability over technical proficiency and reject the need for rigid social organisation, such as appointing a formal director, or widespread standardisation of hardware and software. One of the major challenges for the group – and for laptop ensembles in general – is how to foster collaboration in a group of mixed skills and abilities. BiLE respond to these challenges on a piece-by-piece basis, designing new instruments and infrastructures for each composition, with a focus on making use of the skills and approaches players already have. In BiLE practice, it is the way in which the bounds of collaboration are negotiated anew – rather than their explicit formalisation – that acts as the primary driving force for creation of new work. The willingness of the group to tackle these issues head-on provides a rich context in which to conduct ethnography.

2.2 Ethnomethodological Foundations

One of the unifying aspects of recent third-paradigm HCI research is its shared grounding in an ethnomethodological approach to ethnography [3]. Originally proposed by Garfinkel [11], ethnomethodology adopts a phenomenological or embodied or view of the role of everyday actions. Although such actions may appear routine on the surface, they prove non-trivial to model within technological systems. The value of an ethnomethodological approach can thus be said to be its ability to reveal the underlying nature of interaction as it occurs in specific contexts. As stated by Harrison et al [3], “real-world practice is complex and rich, interleaving physical activity and awareness with abstract thoughts, rituals, and social interaction in ways that defy a purely informational approach.”

The practicalities of conducting ethnography in the ethnomethodological tradition are encapsulated by the practice of thick description [12], where the ethnographer maintains detailed notes in the field, which can later be subjected to formal analysis, in attempt to understand the situated way in which participants reason and make meaning. From an ethnomethodological perspective, people are no longer simply viewed as users of technological systems, as has historically been the case in HCI [3], but instead the fundamentally embodied, social and value-driven nature of interacting with such systems is made central to the focus of inquiry. Such an approach provides “a useful means of understanding the adaptations that are required to make new technologies ‘fit’ complex arrangements of real world, real time activity” [4] and has the potential to provide valuable perspectives from which to approach design.

2.3 The Study

The first author joined BiLE on a weekly basis between October and December 2011, covering a period of ten rehearsals and one concert performance. Rehearsals lasted four hours on average and comprised of a range of musical, interpersonal, individual and group activities, including orientative and reflective discussion, technical setup, troubleshooting and instrument development. Our approach to documenting these practices began with thick description in the traditional sense of the term i.e. detailed documentation of rehearsals using field notes. As we became more familiar with the group’s working practices, our approach shifted to a more technologically-informed approach to thick description, which placed a greater focus on audiovisual documentation of performer-system relationships using close-up video, individual audio and screen recordings. These were taken alongside system logs of network chat and audio and video of the rehearsal space, which were used to capture musical and interpersonal interaction at the group level. Field notes

continued to play an important role in terms of identifying points of saliency. Taken together these methods represented the most detailed description we were able to achieve during later rehearsals.

Although we anticipated that the analysis of the rehearsal data itself would contain wide-ranging implications for design, there was also a need to further understand the knowledge, skills and attitudes that informed members’ musical and technical choices. To this end, individual interviews were conducted with each member and were drawn upon as secondary sources at the analysis stage. In addition, the group generously allowed us access to their internal e-mail list and Dropbox file repository, where the latter is used to share resources such as scores, software tools and prepared sound files amongst group members. Having access to both these resources enabled us to keep up to date with developments between rehearsals, in the same way that group members did themselves. Finally, there were also necessary limitations to the scope of the study. For example, we did not look at capturing work done between rehearsals, in terms of how compositions were conceived of or how software was developed. In future, these could also be subject to documentation and analysis.



Figure 1. Still image illustrating thick audio-visual description of the BiLE rehearsal process.

In total thirty-eight hours of rehearsal time were logged which, when taken together with the aforementioned interview and internal communication materials, provide a rich corpus of data on the ensemble’s working practices. Formal analysis of this material has so far proceeded in two stages. Firstly, the raw audio-visual material and network chat logs from each rehearsal were synchronised and assembled as a multi-camera video file using Apple’s Final Cut Pro X software (see Figure 1). These files were then imported into the Transana package for formal transcription, coding and analysis. Due to the multimodal nature and overall duration of the material, analysis was approached around points of saliency as identified in field notes. This process often prompted consideration of composite material, such as a more detailed analysis of the screen recordings of a particular player. This process is ongoing and the observations presented herein represent the early results of this work. In what follows, we unpack the notion of roles as they relate to a particular composition from the BiLE repertoire, showing how the fluidity of these roles illustrates the complex, socially constructed nature of situated interaction.

3. INSIGHTS FROM INITIAL ANALYSIS

3.1 Roles as Starting Points for Socially Constructed Interaction

One way to approach an understanding of social interaction within BiLE is to consider the different roles members adopt as part of the collaborative process. Formal analysis identified three roles at play, those of composer, performer and designer. The role of the nominal composer in BiLE – that is, the member who is primarily associated with a piece – is to bring

an initial idea to the group and guide the process of collaboration to a satisfactory end point. The role of the performer is to realise the low-level musical detail of the piece through the development and play of instruments. Finally, the role of the designer is to develop instruments and infrastructures that aid both composition and performance.

Notions of composer and performer roles in particular are well established in musical practice, coming with associations that are difficult to evade, while the canonical notion of the designer, borrowed from HCI, has broadly become a central figure in NIME. Although others have proposed new terms in order to dispense with this baggage and reflect modern praxes [13], here we maintain that roles serve a particular socio-technical function, acting as shorthand for members of the group themselves to conceive of interaction and to begin to make meaning. As the term suggests, these self-ascribed roles do not strictly define player's sole activities but can instead be seen as a dynamic set of orientations, which are adopted at different times. The fluidity of these roles can thus be said to contribute significantly to the complex, socially constructed nature of ensemble interaction.

3.2 The Role of Composer in *Laptopera*

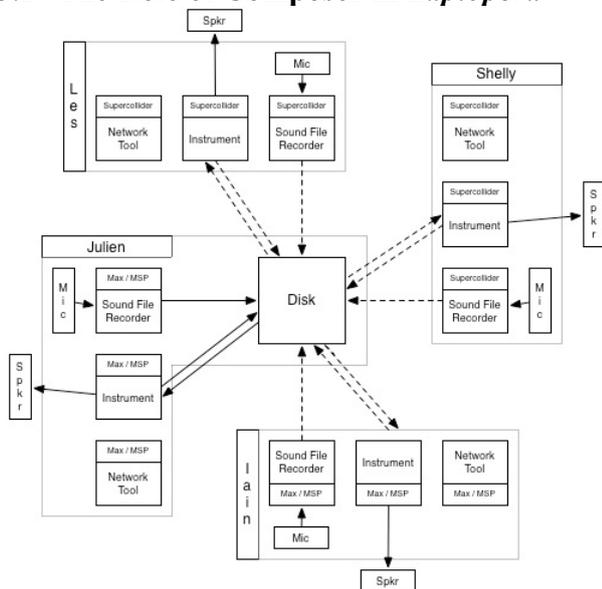


Figure 2. An overview of technology use in *Laptopera*.

3.2.1 Introducing *Laptopera* (Act 2)

Over the course of the study we observed six rehearsals of *Laptopera Act 2: The Reality* by Charles Hutchins. An overview of the different technologies used to realise the piece is provided in Figure 2, showing how players use a composer-designed sound file recorder to share voice recordings over a local area network. In addition, each performer uses a self-designed instrument to process items from this common pool of sound files³. Finally, all members use a network chat tool for text-based communication. Dotted lines in the diagram represent players accessing the shared folder remotely over the network, while solid lines indicate local access by the player hosting the folder. Also of note is the mixed nature of the software environments in use, namely Max/MSP and SuperCollider.

³ Due to space constraints these individual details have been omitted from the figure.

3.2.2 Illustrating the Role of the Composer

At the time of observation, the group favored a composer-led approach, which centered on initial ideas proposed by a single member. Here, the composer acts as a guide, who provides a set of values around which activity is coordinated. The overall process of developing a piece can be seen as an iterative one, where both the instruments and the bounds of the composition are subject to change over time in response from both players and composer, until a satisfactory result is obtained. The meaning of satisfactory in this context is open to debate and although the composer theoretically has the final word, the way in which collaboration unfolds remains malleable throughout. As such, reaching an appropriate end result is always a socially constructed, value driven process.

In the case of *Laptopera*, the initial idea was presented in the form of a text score, which provides both instructions for performers and initial content in the form of a list of lines taken from spam e-mails. The basic specifications define three performance modalities, which require players to 1. Playback sounds from a set of files provided by the composer, 2. Vocally perform and record lines of dialogue provided in the score and 3. Process the recorded lines as they see fit. In addition to describing these basic modes of performance, an indication of how the piece should progress over time is given. The piece begins in the first modality, before progressing through three overlapping sections where players must select from different lines of vocal material. These sections consist of a small number of subject lines (section A), followed by a larger number of short messages taken from the body of the spam e-mails (B), through to an even greater number of lines of spam poetry (C). Once a line has been recorded, players may record only the same or subsequent lines. In all these sections, performers could alternate between any of the three modalities, but mostly moved between recording and processing.

What is particularly notable in *Laptopera* is the way in which the above specification defines particular performance modalities or desirable sonic characteristics, which result in different forms of design. At the composer level, the specification leads to the implementation of infrastructures for networked sound sharing, whilst at the performer level it serves to bound the design of instruments. These can both be seen as acts of standardisation, which serve to establish common ground between players, yet at the same time are informed by artistic concerns.

3.3 Characterising the Composer-Designer

So far, we have characterised the role of the composer in purely artistic terms and in doing so have neglected the way in which software design can form a direct part of the process of composition. In *Laptopera*, a single member adopts the roles of composer and designer and the piece can be said to derive a significant amount of its character from this tightly coupled relationship. The role of the composer-designer here is to both specify and design the shared resources through which musical action may be coordinated. Here we illustrate two particular examples of this type of infrastructural design.

3.3.1 Shared Folder

Laptopera relies on establishing a networked folder, which is used as a resource for sharing sound files. A key feature of the piece is that, once recorded, all members can access this material, allowing newly recorded material to be juxtaposed with processed versions of existing material. Whilst this does not explicitly require software design in itself – as the method used to set up the folder is part of the existing functions of the operating system – it does require consideration by the

composer of how such a resource can be managed and accessed by the members of the group.

3.3.2 Sound File Player

The second example of composer-as-designer in *Laptopera* is illustrated by the use of the sound file recorder, which is employed by all members to make voice recordings to a network folder. Initially, two sound file players were written: one for the SuperCollider users in the group (by the composer), and another for the Max/MSP users (by another member). The perceived benefit of this approach was that it would allow players to better integrate the recorder into their self-designed instruments. However, the group experienced technical difficulties reconciling the two sound file players over a number of rehearsals, and the problem was exacerbated by the fact that the designer of the Max/MSP tool was not always on hand to help diagnose the problem from his perspective. To reconcile these issues, the composer took the decision that all members should use the SuperCollider sound file player. This example highlights the role the composer-as-designer in terms of standardising certain aspects of interaction to ensure that the ideals of the composition can be realised.

3.4 Characterising the Performer-Designer

BiLE practice is predicated on members developing their own performance patches in response to composer-defined constraints. This type of design differs significantly from the composer-centred and primarily infrastructural form we have identified in the previous section and instead focuses on realisation of the low level musical details of a given composition. This is analogous to what Jordà terms digital lutherie [14], which describes the re-coupling of action to sonic result and which encompasses not only software design but also choice of interface and method of sound projection. In BiLE practice, design does not permeate the act of musical performance, as it does in practices such as live coding [15]. It is instead a reflexive process, where instruments evolve in response to experiences gained from playing them – a process which shares some similarities with the iterative development of compositions. The confluence of performer and designer roles within BiLE practice has a number of perceived advantages. Firstly it allows players to develop instruments that are matched to their particular knowledge, skills and values. Secondly, the nature of the performer-designer role promotes greater investment and engagement in the process of playing, which in turn provides a core motivation for participation. When looked at in this way, BiLE can be seen as a value-centred context that supports the production of instruments.

Whilst there are advantages in conflating the roles of designer and performer, there are also potential pitfalls. Freely designed instruments may vary widely in terms of the way they are played and their sonic character, and this can present barriers to a common musical understanding. Such concerns follow on from prior research conducted by the first author as a member of the Huddersfield Experimental Laptop Orchestra (HELO) [10], where a case was made for instrumental diversity. This was in opposition to the standardised composer-designed 'piece as patch' approach, as is often found in the prevalent LOrk model [7]. In HELO practice, these aspects of the LOrk approach were viewed as stifling, and performer design was valued for its ability to foster richness and individuality. What was discussed far less however, was the way in which instruments with similar affordances or sonic characteristics might help to cultivate common ground between ensemble members.

In the specific case of *Laptopera*, the instrument design process is tempered by the initial template specified by the

composer, which ensures that each design conforms to the basic category of a voice-processing instrument. Whilst there may be an argument to be had as to whether standardised instruments are desirable in general, from our ethnomethodologically-informed view of interaction, there was no doubt that this initial staking-out of common ground contributed to some of the coherence and glue of the piece.

4. SOCIALLY CONSTRUCTED INTERACTION IN *LAPTOPERA*

Until now we have largely considered interaction in BiLE in limited contexts as it relates to notions of composition, performance and design. In this section we seek to draw out a number of knottier issues that illustrate the complex nature of situated interaction and which further emphasise the fluidity of the roles at play. We touch on three main ideas here: the idea of socially constructed systems, the role of grounding, and the way in which design shapes the rehearsal process.

4.1 Socially Constructed Systems

Although earlier we acknowledged the primacy of the performer-designer role in *Laptopera*, what becomes apparent on examining performer's screen recordings is that their systems as a whole are a complex, interlocking mix of instrumental and infrastructural software, which must be adopted in its totality in order for players to be able to successfully perform the piece. We define this here as a *socially constructed system*. There is no doubt that such systems present a number of challenges for interaction, such as the degree to which performers are able to devote attention to each of the constituent elements, the extent to which these elements can be successfully integrated into their practice or adapted to their needs, and the ease with which they can switch between different performance modalities that the system as a whole affords. What we seek to emphasise here however is that, as much as socially constructed systems may pose particular problems for interaction, they also represent an important example of collaborative practice in action.

4.2 Influence of Grounding

In section 3.4, we briefly touched on the idea of ground and the way in which composer-designed infrastructures help to establish common ground. Also of equal importance is grounding, which can be defined as members particular ontology, or the knowledge, skills and attitudes in which their activity is situated. Grounding has important implications for both the composer and performer roles, as follows:

4.2.1 Composer Grounding

Although we previously defined the development of the text score in *Laptopera* as the starting point for the composer, composition can also be seen as grounded in the existing practice of the group. Whilst this is to some extent a top down process, in that it involves the formation of an abstract or high level view of what circumscribes the piece, the composer may also draw on the existing capabilities of group members, as well as tools or approaches which have proved successful in the past. A concrete example of this is the way in which the composer repurposed the network tool in *Laptopera*. This tool contains a chat component, which is used throughout the group's practice for announcement of technical problems or performance instructions. In *Laptopera* however, this tool is also used to announce the number of the line of dialogue a player has just finished recording. This plays an important coordinating role, which informs other member's playback choices and allows juxtapositions of material to be quickly sourced. This example shows how composers appropriate

existing tools to new ends, as well as conversely how the group's existing practice has a feed-forward effect, which influences future acts of composition.

4.2.2 Performer-Designer Grounding

In BiLE practice, the act of design is primarily grounded in members' knowledge of software development environments. During rehearsal, performer-designers fell into two camps, those who used Max/MSP and those who used Supercollider. This domain specificity cultivated common ground between members, who were able to more easily share ideas and troubleshoot each other's patches. It was interesting to note that technical proficiency was not a direct indicator of artistic ability, as less experienced players were able to assemble solutions from larger pieces sourced from tutorials or community examples. However, technical ability did impact significantly on how well players were able to integrate the different parts of their performance systems. For example, in *Laptopera* one player had to resort to manually dragging-and-dropping sound files between the shared folder and their instrument patch, which impaired their general responsiveness. This was in contrast to the composer-performer member, who had designed a system to automatically connect these two components, allowing for immediate selection and processing of recently recorded sounds.

This confluence of performer and composer roles presents particularly interesting implications for interaction. From one perspective it can be said that the composer-performer seems to possess the necessary grounding to be able to integrate the infrastructural and instrumental elements of the system. However it also could be said that composers who possess strong design skills are more likely to draw on design in service of composition in the first place.

4.3 Impact of Design on Rehearsal

When placed in a collaborative context, the essential feature of the laptop as a reconfigurable tool serves to complicate traditional notions of the activities that constitute rehearsal. Therefore, a key challenge for laptop ensembles is how to incorporate design as part of rehearsal practice.

In BiLE, the rehearsal process extends beyond the actual act of playing music together, to encompass activities such as instrument development and technical troubleshooting. These activities, which primarily involve player and laptop, can prove problematic in a number of ways – as we observed – such as the demoralising effect of troubleshooting on the rehearsal process. Despite this however, we argue that the primacy of design within the BiLE approach means that collaborative design activities should figure as part of the rehearsal process. For example, whereas in instrumental practice, the idea of a string quartet remodeling their instruments during rehearsal might seem strange, the iterative nature of composition and design in laptop performance – which each require reflection and adjustment over multiple rehearsals – suggests that both should form a part of the process. To ignore these factors would be to ignore the benefits of sharing design practice, which would seem to be an important motivator for participation. As a word of caution, from our observations it would seem that diversity in terms of instrument design exponentially increases the potential difficulties.

5. CONCLUSIONS

During the course of this paper, we have presented a field study of the Birmingham Laptop Ensemble, as informed by the use of ethnomethodology in third-stream HCI research. Early results provide a fresh perspective on the roles of performer, designer and composer in laptop ensemble practice and we have paid

particular attention to the way in which the design serves to confound established notions of composer and performer roles. Of particular note has been the way in which the act of composition served to standardise group-level networked interactions in terms of infrastructural design, but which also placed constraints on the instrumental design undertaken by performers. Both these constraints delineated common ground and established the conditions necessary for individual performance styles to emerge.

Taken together, the fluidity of composer, performer and designer roles reflects the complex, value-centred nature of collaboration in BiLE practice. As we observed, these roles are not clear-cut from the outset, but are instead socially constructed. We also found that this social activity was inscribed within the software performers used, resulting in what we term socially constructed systems. This points to the need for further research to look to social as well as technical factors in the development of tools to support laptop ensemble performance practice.

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