

Artefact ‘scripts’ and the performer-developer

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ABSTRACT

This paper presents an approach to practice-based research in the NIME field focused upon self-reflective practice in a creative-production research project. The author’s practice-based doctoral research is used as a case study to examine the research approach in the context of performer-developer devised technological artefacts. Drawing upon actor-network theory, and in particular Akrich and Latour’s notion of the ‘script’, the emergent findings of the author’s research are situated within the context of theoretical constructs common in the field of Science and Technology Studies (STS). Particular attention is given to the dual role of the performer-developer in such contexts, questioning the relationship between design and use from this unique perspective.

Keywords

Interactivity, performance systems, improvisation, actor-network theory, reflective practice, material agency

1. INTRODUCTION

The interrelationship between creative practice and research is a complex, multi-faceted and often elusive aspect of the NIME field. Questions such as *what constitutes a research contribution?*, *how might we obtain meaningful research data?* or *what is the purpose of evaluation?* return frequently throughout the life of a research project, and lie at the heart of practice-based research agenda. For the doctoral student engaged in creative practice research, such questions of research scope are many and varied, and the push and pull between developing creative work and producing new knowledge can be a source of tension.

As a performer-developer my creative practice involves programming and performing with my own software artefacts, with a specific focus upon the exploration of interactivity and autonomy in human-machine improvisation software. My research is focused upon the way in which software design and use are intertwined in this type of practice, and how both contexts help to define modes of performance practice and theoretical understandings of designing for interactive performance. The aim of the research is to understand the emergent creative practice of interactive system design from a practitioner’s perspective, and to open up the process of design, development and use of these systems using a self-reflexive and autoethnographic approach.

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1.1 Problem-solving vs. Creative-production

Stephen Scrivener has suggested that although much practice-based research centres upon the creation of artefacts, there exist fundamental differences between artefacts developed as a response to justified and well-defined research problems, and those projects focused upon creative production that use practice as a vehicle for exploring complex research themes [1]. The author distinguishes between traditionally understood *problem-solving* research projects and what he terms *creative-production* projects typical of practice-based research. According to Scrivener, artefacts developed in *problem-solving* research projects are presented as either novel artefacts posited to solve well-defined problems, or as improvements upon already existing artefacts [1]. By contrast, *creative-production* research projects are often concerned with the generation of artefacts as a means to investigate, explore and define research problems as well as to solve them. Problems arise through the practice of artefact creation, and research themes are developed and explored through subsequent moves in practice. As such, the development of artefacts themselves remains the main research focus, and the explication of the process of design and development therefore forms an integral part of the project’s contribution to new knowledge [1].

2. CURRENT RESEARCH

My current research resonates with Scrivener’s description of a creative-production project, with the *_derivations* interactive performance system forming the central artefact underpinning a self-reflexive practice-based research agenda. The system has been presented in various international conferences and fora including NIME 2012, ICMC 2013, ACM C&C 2013 and ACM 2012/12 (for a full description of the software see [2]). *_derivations* was designed to be used first and foremost by myself as a saxophonist, and only later for other improvising musicians. As such, my artistic and creative expression is embedded in the design of this system unhindered for the most part by concerns related to the generalisability of the artefact. This kind of development is creative and exploratory, and due to my artistic motivations it has been focused upon the investigation of new forms of interactivity as opposed to searching for the optimal solution to a problem.

The performance practice that has developed in tandem with the development of *_derivations* is characterised by a search for new understandings about human-computer interaction in musical performance. The kind of design I am involved in is therefore ideas-generating and a form of hypothesising, and is focused upon the reciprocal relationship that has developed between both design and use of the software. For Gray, the practitioner-researcher undertaking a practice-based research project identifies “researchable problems raised in practice, and responds through practice,” and often plays a multi-dimensional role of that of a creator of research materials (art/design works), observer of self and others and as collaborator in collaborative work contexts [3]. As a practice-based researcher, my research strategy has been one of action

and reflection, both in the moment of development and performance (*reflection-in-action*) and through sustained and distanced reflection on past design processes and performances (*reflection-on-action*) [4].

2.1 Emergent research themes

Instead of designing a performance system that solves a well-defined and justified research problem, the process of artefact development in my research has therefore been one of *problem-posing*. Though a cyclical process of design and development, performance and reflection, specific research themes and questions have emerged through my practice. To understand this process reflective practice and autoethnography enables a look into both the design and usage contexts, delving deep into my developing practice and making links between various complimentary sources of data. Through the development of the *_derivations* software, I have archived many hundreds of MaxMSP patches, audio recordings, screenshots and reflective memos of my design process. By triangulating the various forms of data I have begun to draw out a narrative of a design process that is surfacing some of the most salient research themes related to the creative practice of the design and use of interactive performance systems.

Such research themes include the relationship between design decisions and modes of distribution of bespoke software artefacts, modes of interactivity surfacing from my emergent performance practice, as well as understandings about the role of perceived machine agency in shaping performance practice in both the rehearsal and performance contexts with *_derivations*. I believe that this way of looking at contemporary performance practice acknowledges the complexities of this hybrid space, rather than seeking to evaluate such artefacts using traditional metrics common to HCI. In addition, it enables the researcher to connect emergent themes with theoretical understandings of the domain in question, and for the research project to advance theory in relation to new forms of creative practice.

2.2 Performer-developer context

As my research project has developed and the *_derivations* system has matured, my research focus has moved inwards towards the process of design and the specific dual role played by the performer-developer in such artistic practices. I am interested in understanding how as a performer-developer one defines and projects a role for oneself as a performer through the design process, and conversely how through performance, one defines and refines one's role as a designer. Through iterative cycles of development and testing, this process helps to define and develop human-computer performance practice as well as the expectations we as artists have of our machines.

The specificities of this type of practice may open out to reveal larger societal/cultural constructs, however the general scope is focused upon the relationship between design and use of a what Akrich has described as a 'non-stabilised' technical object/artefact [5]. Although a microcosm of artistic practice, the specific artistic context of the performer-developer is unique and relevant to research in the creative arts, specifically surrounding the separation of design and use of technological artefacts. As a performer-developer, the dichotomy between design and use is distinctly blurry in my artistic practice. Analysing the negotiation between design and use in this specific context enables a glimpse at a form of design that may be less likely to suffer from any loss in translation between designer and user, what Akrich has defined as a 'failure to adjust' [5].

3. THEORETICAL CONSIDERATIONS

3.1 Akrich, Latour and the *script*

Akrich has defined the development of a *script* as the projection of a virtual user into and through a technical object [5]. Through the design process, the designer inscribes and projects roles for 'virtual users' into the workings of the artefact being designed. As such, how might we understand the emergent process of artefact development for the performer-developer? In such a context, often the artist is primarily designing an artefact for himself or herself as user, and as such we might assume there to be an extremely tight correlation between the real and projected/virtual user. However, this view of design and use in this context does not acknowledge the complex interaction between the technical design process and a developing performance practice. It is my view that the virtual user is itself informed by feedback from the real user's experiences, and so the two develop entirely in tandem with each other.

Akrich and Latour's notion of the script foregrounds the importance of technical objects as mediating forces within interaction, social networks, culture and society [5]-[7]. An artefact's script is a rich and complex way of understanding both the motivations and domain specific assumptions of designers in the design process, as well as the way in which real-users interact with the affordances expressed through the material agency of the technical object/artefact [6]. This area is posing a number of complex questions for myself in my research. What might we understand about the coupled nature of tool development and performance practice in such artistic contexts? Does the performer-developer project a future, virtual version of him or herself into the design scenario? If so, to what extent is this projection influenced by known technical constraints, as well as feedback from the real user's experiences? Does the artist know concretely what they want from an artefact before they begin to design it? Is the very development of an artefact the most direct embodiment of user-centred design, where the user becomes the designer?

I believe there is something more complex at play, where the disconnection between use, design and development creates a hybrid virtual/real user. This hybrid is by definition not stabilised or black-boxed, as s/he assimilates new possibilities encountered in the design process at the same time as directly influencing this process through use. The act of developing such artefacts is simultaneously an act of artistic creation, as well as self-development. The artist defines themselves and their artistic beliefs through the development of the tool itself. The concept of prototype development and playtesting is a crucial part of such design scenarios, however often in these contexts there is a distinct lack of differentiation between an artefact as prototype, artefact as under-development, and artefact as finalised.

3.2 Dual role of the performer-developer

The concept of 'role' as it applies to Akrich and Latour's script is made more complex due to the dual roles played by the performer-developer; i.e. the designer as user, and user as designer. Because of the inherent intimacy between design and use in this context, it would be easy to suggest such a dual identity precludes an understanding of scripting of a 'virtual user' in the traditional sense, as the virtual user is in fact the designer him or herself. However, I would suggest that especially in such exploratory artistic contexts, we must account even more fully for the power of material agency in shaping the way in which an interaction unfolds. For the performer-developer, the process of passing over from being a

developer to user is a distinct one – a definitive shift in role that must be acknowledged. Whether testing the artefact in the studio or on stage, the performer-developer as ‘user’ distances themselves from their own design history, effectively black-boxing the tool in order to navigate the script proposed by the machine itself. This process might be thought of as enabling the performer to ‘suspend disbelief’, and to succumb to material agency during performance. This is a complex space where material agency interfaces with the history of the designer’s decisions in the moment of performance.

As discussed in Mattozzi [8], whilst Akrich’s definition of the script focuses upon the designer’s projections of a virtual user onto the technical object, for Latour the artefact itself can be analysed without reference to the designer’s decisions. There is a difference between the designer’s conceptions of the usage scenario and what the artefact itself enables/allows, i.e. its *competences*. Rather than focusing upon the disconnection between design and use however, Latour’s analysis seeks to discover the script of the artefact itself and how this can be seen as an expression of material agency. Looking first at the object itself is a way of stripping back the biases inherent in context. The process of analysing an object is therefore not necessarily to ‘uncover’ the designer’s script as imbedded in the object, but to understand the object’s own script as perceived.

3.3 Hamman, Foucault and the *episteme*

Hamman [9] has discussed issues of representation and signification in the composition of computer music, making particular reference to Foucault’s concept of *episteme* as it relates to the design and use of musical interfaces. For Hamman, there is an important distinction to be made between artefacts/mechanisms that enable music making through use, and those that engage a user to contemplate the usage context itself. In the former, the user employs the artefact as a transparent means through which to achieve an outcome, whilst in the latter, the tool itself comes into sharp focus, forcing a consideration and navigation of its affordances. The author details an approach to composition and interface design whereby the composer’s role is redefined towards interacting with and navigating the task environment itself, as opposed to composing music *through* a task environment. Using Jackson Pollack’s practice as an example, the author describes an approach to interface design that disrupts accepted methods that have developed around certain types of tools.

From a semiotic perspective, Hamman distinguishes between two overlapping dimensions of human performance in interaction with a mechanism; that of an *action* and a *description*. An action is that which ‘can affect change within an environment’, when coupled with a mechanism. It is made in order to ‘alter the state of the mechanism, and thus its outcome’ [9]. A *description*, by contrast, defines how the user understands the relationship between an action and its outcome. A description allows the user to hypothesise a mapping between action and outcome, which Hamman describes as an ‘internalized framework that determines our actions and observations regarding our use of some mechanism’ [9].

Hamman explains that descriptions are formed historically, both culturally and personally. For familiar mechanisms, a user’s understanding of action-outcome relationship has been formed prior to an interaction, whether through personal experience or cultural understanding of the mechanism’s affordances. For the unfamiliar mechanism, a user’s personal interaction with the mechanism informs the description through use. Hamman introduces Foucault’s concept of *episteme* here to situate the description in relation to the unfolding of an epistemological frame. Developed in *The Order of Things*,

Foucault’s concept of the *episteme* denotes the structures that underlie the production of knowledge during a particular epoch, or the grounds upon which a statement can be counted as knowledge [10]. In this context, Hamman describes the *episteme* as the way in which ‘a mechanism, within an interaction, comes to make sense through description.’ [9] Regardless of whether the description has been developed culturally or personally, this historically situated understanding of the action-outcome relationship provides the grounds upon which a user understands the outcomes of an interaction.

Hamman draws a distinction between Foucault’s *episteme* as either closed or open, seeking to establish a basis for the development of interfaces that challenge the traditional notion of a usable, transparent ‘tool’. According to Hamman, a closed *episteme* is ‘deeply coupled to the cultural/technical program according to which the mechanism is designed’ [9]. Such a ‘program’ informing design and development has been developed through historical precedent and defines the boundaries by which a mechanism is designed. What Hamman suggests is that the usage context of the mechanism/artefact (defined by the *episteme*) shares this technical/cultural frame of reference. As a result, the user’s expectations of the outcomes of an interaction with the artefact are in line with the designer’s specifications.

By contrast, an *episteme* as open is not wedded to such historical frames of reference. This may not preclude a design rationale that is informed by recognisable cultural/technical precedents, however these may not appear as immediately accessible through interaction with the mechanism. As a result, as Hamman suggests, an open *episteme* is one in which the particularities of the domain in question define the usage mode of the mechanism, therefore beginning to establish a frame of reference for its use. The *episteme* is ‘porous, open to input from the particularised situation’ [9]. Characterised as a ‘disruption’ of a historical frame of reference, the user is put in a particularly interpretive position, whereby their understanding of the mechanism’s affordances is reliant upon the object’s inherent script of action as imbedded in the mechanism.

3.4 The *script* and the *episteme*

Hamman’s understanding of the *episteme* in this context can therefore be conceived of in relation to Akrich and Latour’s *script*. As closed, the *episteme* enables a tight correlation between the designer’s inscription of the virtual user, and a user’s de-scription of the technical object. Both real and virtual users are aligned as the user approaches the object with an understanding of the interactive paradigm that matches the designer’s ideal usage context. As open, the *episteme* is continually receiving input from the user’s understandings of the new interactive domain. The designer may have inscribed a virtual user into the object that is far removed from the experiences of real users, or the user is unsure as to their role as user at all. In such a context, the user’s de-scription of the technical object relies upon the material agency of the object itself, and they are directly contributing to the artefact’s *episteme* through use.

4. DISCUSSION

In the design and usage context of a NIME developed by a performer-developer, I would suggest that the *episteme* moves between being open and closed. Through prototyping and playtesting, the performer-developer develops a working understanding of the affordances of the artefact in performance, despite known decisions made in the design process. In addition, the historical/cultural frame of development is interrogated and questioned through performance. Experiments

in this frame (both in design and use) are therefore of the utmost importance. The space in which a tool is purposefully left open enables new descriptions to be formed. These descriptions feed directly into new understandings of the design space, ultimately feeding back into future interactive encounters.

From Latour's work and the concepts developed in actor-network theory we know that a technical object/artefact can be attributed agency in its own right. The relationship between user roles inscribed in the design process and their interpretation through use poses significant questions for the performer-developer context. Rather than projecting a fixed 'virtual' user through the design scenario, in my practice I conceive of *derivations* as a means of discovering an emergent user, and evolving a personal human-machine performance practice. Through testing, performance and refinement, this user comes to reveal itself as part of an emergent performance practice that cannot be separated from the design of my software artefact. An open design process such as this interfaces directly with an openness in performance. As a performer, I am actively 'suspending disbelief' in performance, black-boxing the artefact and my personal history of design decisions in order to navigate the performative environment proposed by the machine I have created.

In the context of human-machine improvised performance, a central aim of the software development process is to define and harness material agency to provoke new modes of musical discourse. It is a way of asking questions about performance practice, and for developing new modes of interactivity. Through periods of negotiation between human and material agency emerges a process of *interactive stabilisation*, where the artefact, user and their intersection emerge and redefine themselves through interaction [11]. For the performer-developer, a direct consideration of machine agency (both in design, testing and performance) surpasses and extends the frame of reference provided by the intentions of the designer. Because this cultural/historical frame is known intimately (it is the very personal history of the designer), the relationship between the known and predicted output of the machine and the emergent understandings of the interactive context are revealed through active black-boxing of the machine in order to more fully engage with material agency expressed by the software artefact.

5. CONCLUSION

Practice-based research projects in the context of NIME have much to contribute by focusing on the process of development itself, in addition to the development and evaluation of technological artefacts. The connection of emergent artistic and performance practices to established theory enables the researcher to use creative practice as a way to ask questions about the domain of practice itself, and to understand the answers in relation to existing bodies of theoretical knowledge. For performer-developers, the collection of research data and choice of evaluation methods should acknowledge the mutualistic relationship that exists between both the artefact and the developing performance practice connected to it. Understanding the nuances of a creative practice from within enables a holistic view of technical and artistic developments in the NIME field. Such insights into emergent practices have the potential to provide rich and multi-layered contributions to the field.

Throughout the life of a research project, research questions and themes often only reveal themselves as a consequence of moves within practice, making the practical domain a space for both generating and responding to research questions. In my research I am using self-reflective practice to examine the

unique nature of the performer-developer context in human-machine interactive performance. By focusing upon the relationship between design and use in such contexts, we can begin to understand the complexities of not only our newest interfaces for musical expression, but also the situated nature of the newest performance practices that are emerging from their development and use. Self-reflective practice therefore provides a unique way of accessing and explicating research themes that are developing around the creation of new musical interfaces.

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