A VJ Centered Exploration of Expressive Interaction

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ABSTRACT

This paper identifies key themes of expressive interaction for VJs. VJs are visual artists who use digital media to express themselves to an audience during a live audio-visual performance. Those designing for the expressive use of technology can gain insight from an articulation of expressive interaction from the perspective of VJ practice. This is developed using a novel qualitative methodology designed to be sensitive to the subtle and tacit nature of expression. We detail our methodology, present the results of its application to a group of VJs and conclude with a discussion of the implications our findings may have for those wishing to design for VJs, or those in related domains that involve expressive interaction with technology.

Author Keywords

Creative response, dialogue, documentary film, expressive interaction, methodology, thematic analysis, VJ.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design, Human Factors.

INTRODUCTION

Expression, *"the action of making known one's thoughts or feelings"* [22], relates to the conveyance of ideas and emotion through the manipulation of a medium. In music for example, expression inhabits the nuances of a performance and is often associated with communicating emotion, or evoking an emotional response, in the audience [4, 23]. Similarly in art, a work is said to be expressive if, for an observer, it arouses a particular feeling or emotion [18]. Hence, if it is to contribute to the design of expressive interaction, HCI needs methods that are sensitive to the more nuanced spaces of user activity that expression inhabits. Moreover, a deeper understanding of expressive interaction would assist those wishing to design for the growing body of expressive and creative users of

technology and would provide a distinct standpoint from which novel ideas about interaction may be developed.

In this paper we make two contributions to the field of expressive interaction. We provide an analysis of the important qualities of interaction for one group of users for whom expressivity is pivotal, video-jockeys[1] (VJs). Our findings provide a novel perspective on expressive interaction, which has the potential to inspire and guide future discussion of the topic in HCI. The methodology we developed to explore expressive interaction for VJs involved a novel twist on qualitative research methods that responds to the creative nature of the group involved. The methodology used combines two well-known approaches to qualitative research, documentary film [25] and Focus Groups, and includes a novel *Creative Response* activity. As well as helping us to understand VJ practice, our methodology may also be a useful mechanism for exploring other creative and expressive settings.

EXPLORING EXPRESSIVE INTERACTION AMONG VJS

VJs adapt and appropriate technology in order to attain expression through visual media. Indeed, it might be helpful to consider them as pragmatic designers [7] who in the development of a performance evaluate technology primarily in terms of expression. By studying the qualities that underpin the VJ's relationship with technology we sought to uncover insights from a novel perspective that will assist in the understanding of expressive interaction. We also believe that this approach will help to inform the development of expressive interfaces for both the VJ and potentially those in related disciplines such as electronic music.

VJing and other creative performance domains have been considered previously in an interaction design context. A primary concern of this research was the relationship between performer and audience. Interactive surfaces have been designed to make the audience aware of a VJ's actions using enhanced visibility [17] and collaboration [32]. Empirical studies have also explored aspects of this relationship [9] and addressed issues including the spectator

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[1] The VJ is a visual artist whose practice is based upon the live performance of visual media such as video or computer generated imagery; a comprehensive description can be found in [8].

experience [29] and audience participation [30]. Furthermore, Engström et al. explored the integration of VJs' aesthetic, interface and social preferences into a participatory scenario using mobile devices [6]. Our work is distinctive as we consider VJing from the explicit standpoint of expressive interaction. Aspects of our findings do touch upon the performer-audience relationship; in these cases we hope to provide novel insight that will further its understanding as a concept in HCI.

Expressive interaction, in a practice such as VJing, is a challenging concept to study from an interaction design perspective. Being expressive is not a distinct action or task that can be isolated for study, but rather a phenomenon that arises as a consequence of how an action is completed. Consider two methods of playing the same musical note: plucking a guitar string and clicking on a sound file. The former involves qualities such as control over timbre that make it, at least to the guitarist playing the note, a more expressive act. For this reason we must take a more holistic approach in our investigation that not only captures *what* the VJ does, but also the nuances and contexts of action that define *how* they do it.

The qualities of interaction in an expressive practice will likely be subtle and many of the features that define expression in VJing may be tacit [24]. When investigating tacit elements we expect to encounter the *"say-do problem"* [1] where the difficult task of adequate articulation results in a gulf between the VJ's account and their practice. Therefore, our methods must be sensitive to not only the face value of an action but also the deeper, less easily described, concepts that underpin it. Suitable methods are likely to involve the kinds of personal responses and interpretations of data that require a great deal of reflection and critical analysis. We therefore see our findings as provisional, as a contribution to a conversation on expressive interaction that results in an inter-subjective understanding [5] with the VJ about their practice and relationship with expression.

In response to these challenges we have developed an approach to engaging with, and understanding, VJs and other expressive users of technology. Our methodology begins with the creation of a documentary film [25], which forms the basis of a multi-stage dialogue with the VJs.

Documentary Film-making
In the first stage of the process a documentary film is created about a small group of VJs. The documentary is produced by a professional filmmaker who is accompanied and assisted by one of the researchers. We follow the VJs as they prepare, practice and perform their work. In addition to gathering footage for the film, this process acts as our initial inquiry and leads to our first interpretation of the subjects' practices. This understanding develops as we view, analyze, select, and edit footage to produce the film.

The role of documentary film in our process extends beyond a video ethnography. When analyzing a concept as intricate as expressive interaction in VJ performance, we resolve what we observe into a personal interpretation. The creation of a documentary film produces an artifact that can be used to communicate this interpretation to the VJ and hence form the basis of a reflective dialogue through which our understanding may evolve. Film captures and portrays the *"elusive details"* of situations [3] that other methods of presentation, such as a vocal or textual description, may miss. As such we are able to illustrate our interpretations of expressive interaction in the detailed context of the practice from which they arise. Moreover, film places the viewer, in this case the VJ, in a situation from which they may witness the reality perceived by the filmmaker [26]. By presenting our ideas through film we therefore enable the VJs to observe their practice from our point of view and consequently engage with and discuss it with this perspective in mind.

Exchange
In the next stage we initiate a conversation about the portrayal of each VJ in the film. A Focus Group is held and attended by one of researchers, the filmmaker, and the VJs, who will be referred to from here-on as participants. The film, which comprises short vignettes describing each VJ performance, is shown. Following each vignette a discussion is held. We intend the topics of discussion to be primarily guided by the participants in reaction to the film. However, at times the researcher may ask for comment on a particular aspect of the vignette.

The principal aim of the Focus Group is to elicit data from the participants that will advance our interpretation of their practices. The film plays a significant role in this activity for three key reasons. First, the film communicates our interpretation to the subject so they may challenge or affirm it. Second, by presenting the participants with a portrait of their practice that may not match their personal viewpoint, we hope to inspire them to reflect on their work and thus consider and discuss the issues that shape it from novel perspectives. Finally, video footage has been shown to enable the re-experience of tacit skill in a manner more conducive to understanding and reflection [27]. Therefore the film will assist in the articulation and discussion of tacit elements of VJ practice tackling the *"say-do problem"*.

As a methodology, Focus Groups are highly appropriate for fostering self-reflection amongst participants. Group discussion of a topic allows participants to explore and clarify their ideas; and therefore advance and change them in response to the views and experiences of others [15]. Thus, the participants will be provoked to reflect on issues of their practice as they are discussed from alternate perspectives and depicted in the practices of others. Furthermore, Focus Groups give participants a better opportunity to control how topics are addressed by *"generating their own questions and pursuing their own priorities"* [16]. As a result, participants will use their expert knowledge of the domain to question each other about issues that differ from those broached in the film.

Focus Groups also have disadvantages in the current context as they have been found at times to stifle the opinions of individual participants in favor of views held more widely in a group [15]. As such it may be difficult to gather the whole spectrum of opinions on an issue and differentiate the views of individuals from those enforced by the group. This dilemma is particularly relevant in the context of expressive practice where a homogenized group opinion may not capture the rich variety of views about an issue. For this reason, each of the participants is interviewed individually following the Focus Group. Each interview lasts approximately 20 minutes and follows a script that is derived from the topics discussed in the Focus Group. As a result, we hope to examine those issues considered important by the group from the perspective of each participant's individual practice.

Creative Response

The final phase of our methodology is a novel *Creative Response* activity. The activity makes use of the participants' standing as creative practitioners by asking them to create a short re-edit of our documentary film, which emphasizes their response to a particular issue (or range of issues) that arose from our film or during the Focus Group. Participants are provided with the raw footage of the film and digital video editing equipment. They are then given a period of around two hours to produce a response that is approximately 2-3 minutes in length. On completion, each response is presented by its creator(s) to the other participants and the researcher. The presentation of the response is coupled with a short vocal rationale that explains its content.

We envisage that there exist elements of expressive interaction that are so intertwined with a practice that reflection on them, and their articulation, outside of its context is particularly challenging. Hence, the retrospective discussion of the Exchange phase may not be sensitive to particular aspects of the participants' practices. The *Creative Response* activity responds to this challenge by using the creative act of film-making to afford both contextual communication and reflection amongst the participants.

Film provides a language through which the participants may incorporate elements of their practice directly into the discussion of an issue. By selecting particular clips, the VJs may demonstrate concepts such as the significance of their personal visual aesthetic that might have proved difficult to articulate during the earlier stages of the methodology. Furthermore, the creative process of making a short film presents the participants with the opportunity to reflect about their practice in a detailed and methodical manner. As footage is edited to respond to individual issues, the participants are given the opportunity to examine, and reflect upon, the account they are hoping to convey in the detailed context of practice from which it arises. Moreover, the Creative Response activity will be approached by the VJs with the ideas raised by our film and the Focus Group
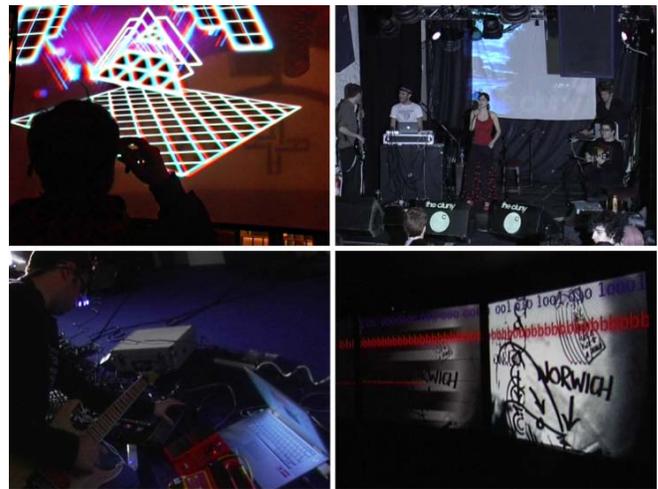
Figure 1. The featured performances (clockwise): (a) 3D Disco, (b) Electro-Flamenko, (c) Kinetxt, (d) Tron Lennon.

in mind. Hence, the participants may be inspired to cross examine their practices from these novel perspectives, and feed insights from this further reflection into their response.

AN APPLICATION OF THE PROCESS

In the following sections we describe an application of our process that studied the practices of four VJs/VJ collectives. The study of four performances allowed time for a much deeper investigation than would have been possible with a broader sample size. The documentary film that would provide the focus for the exploration was produced by a filmmaker and the first author during a month long audio-visual arts festival. The film, which featured each subject's performance, had a total duration of approximately 12 minutes and was divided into four vignettes that were on average three minutes in length.

A montage style was adopted where interview footage, shot throughout the film-making process, was placed alongside relevant scenes of the subject at work or in performance. This approach was chosen to create a film that portrayed our interpretation of the performer as a reality or truth that was depicted with their words and actions alone. As a consequence we hoped to evoke a much stronger response than if we had actively spoken our ideas with the addition of a narration track. An abridged version of the film can be seen in [11].

Over the following sections we give a quick introduction to each of the featured performances and briefly describe the interpretation of the work that we wished to convey in the film. As VJ practice is both public facing and personally significant, with their explicit permission, we use the participants' real names in our analysis and discussion.

3D Disco

The 3D Disco is a performance which takes place in a night club setting. The piece is produced by a large collective of VJs, two of whom (Andrew and Elliot) took part in our exploration. The performance consists of 3D images that are projected around a venue; audience members wear

special glasses in order to see an anaglyph 3D effect. The visual materials are created prior to the performance in the studio and are then divided up into short clips that are triggered by the VJ in a semi-scripted sequence together with a soundtrack. Figure 1 (a) shows an audience member silhouetted against a screen during the 3D Disco.

The vignette emphasizes the relationship between audience enjoyment and the theme and content of the 3D Disco. We stress how the technical challenge posed by the presentation of 3D visuals limits the ability of the VJ to improvise and experiment in the moment of performance. We contrast this discussion with footage of audience members reveling in the atmosphere of the event and an interview of the VJ just after leaving the stage, where he recalls his enjoyment and satisfaction with the performance. Accordingly, we hope to question whether or not the audience's experience is negatively affected as a consequence of the reduced scope for improvisation and experimentation posed by the pre-rendered visuals.

Electro-Flamenko
Electro-Flamenko is a band that fuses traditional Flamenco and electronic music. The band consists of musicians, singers, dancers and a VJ (Alasdair), who is the primary subject of the vignette. Alasdair performs on stage alongside the other members of the band. He manipulates video clips using a MIDI controller[2] and the commercial VJ software Modul8 [20]; the resulting images are then projected at the rear of the stage. Electro-Flamenko can be seen in Figure 1 (b).

The vignette highlights the holistic nature of Electro-Flamenko and consequently that Alasdair's visuals are intertwined with, and hence less meaningful without, the other visual and sonic elements of the band. Footage of the differing elements of the band is shown alongside interview footage of Alasdair speaking about his idea of a complete audio-visual artwork and the importance he places on the link between image and sound. We bring to light Alasdair's requirement for an interface that allows for powerful manipulation of visual material but is also portable enough to accompany him on tour. Therefore we hope to ask whether an interface must be complex and bespoke in order to be expressive, or if something simpler is adequate.

Kinetxt
Kinetxt is an interactive visual performance, created by two VJs (Toby and Andrew), that is held in venues ranging from galleries to nightclubs. Audience members enter passages of text using computer terminals that are situated around the performance space. Using a Nintendo Wii [35] controller, a performer creates a narrative from these passages, which is then displayed on a large panoramic

screen. In addition, this narrative is illustrated by a graffiti artist whose sketch pad is projected behind the passages. The audience responds to this evolving narrative by entering further passages of text; as such a dialogue develops between the performer, graffiti artist and the audience. Figure 1 (c) shows the panoramic screen during a performance.

By showing a collage of the elements of Kinetxt from the perspective of an audience member, we hope the vignette stresses how the performance surrounds and immerses the viewer. We include interview footage of Toby giving an in-depth walkthrough of the technical infrastructure behind the performance. We hope as a result to expose the role technology plays in creating an environment conducive to a particular experience, of immersion in a dialogue, rather than as a tool of manipulation or presentation as in the other vignettes.

Tron Lennon
Tron Lennon is a collaboration between two improvisational electro-acoustic musicians (John and Paul), who describe their performance as an experiment into the inclusion of visuals into an exclusively musical practice. Paul has a background as a turntablist whilst John has a background as a guitarist. In their visual practice they extend the capabilities of their instruments in order to improvise with video material. Paul uses the MsPinky digital vinyl system (DVS) [21] to scrub through video clips using a turntable, whilst John augments his guitar with a range of camera feeds that are manipulated in response to his guitar and effects units. Figure 1 (d) shows John surrounded by his equipment during a performance.

The vignette emphasizes the contrast between the practices of John and Paul. We hope to show that rather than co-creators of a single practice they are two performers, with well-defined practices of their own, in collaboration. Interview footage of Paul speaking almost exclusively about his desire for finite control and powerful manipulation of video content is set next to John's discussion of the adaptation and misappropriation of technology. Footage of Paul and John's visuals are shown in isolation to illustrate the contrasting aesthetics that are combined to produce the final visual output. We hope through the isolation and juxtaposition of aspects of both practices to enquire about the reasoning for, and consequences of, their collaboration.

ANALYSIS OF THE VJS' EXPRESSIVE INTERACTION
The Exchange phase of our methodology revealed insights that lead to a thematic articulation of the qualities of expressive interaction among VJs. The Focus Group and interview sessions combined, produced a data set consisting of approximately 4 hours of video footage. After transcription, a Thematic Analysis was applied according to guidelines set-out by Braun and Clarke [2]. The transcripts were first open coded to highlight potential trends in the participants' discussion of their expressive practices. Following this, an iterative process was completed whereby

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[2] *MIDI controller* refers to hardware control devices typically used by performers to interact with software based instruments and tools.

the initial trends were grouped into categories, and these refined. We followed an *inductive* rather than a *theoretical* Thematic Analysis and therefore the coding and categorization process was not guided by any pre-determined theoretical frameworks or hypotheses.

Although a thematic analysis was carried out, there is not space to present the full account here. Instead, we present sufficient analysis and quotations to explain those themes that are most relevant to the aims of this paper. When taken together with insights from the *Creative Responses*, the reader should be able to gain an insight into the VJs' practices and experiences to a depth which is sufficient to understand how the results inform and inspire the design of expressive interfaces for them.

Aspirational
The first key thematic category was the range of desires and intentions that shaped each of the participants' practices. These conceptual aspirations inspired and guided both the structure and content of a piece and its live performance.

Evocative
Andrew and Toby discussed a desire to evoke particular experiences within the audience. Andrew explained how the 3D visuals in his performance were designed to stir up feelings of astonishment or amazement. Toby spoke about how Privy (a performance mentioned in comparison to those featured in our film) was designed to create an emotional experience for those witnessing it:

"Privy is kind of this very kind of dream like thing where if you sit back and let it wash over you it is a very emotional experience." (Toby)

In other extracts, Andrew described how he aimed to create immersive experiences, through audience participation. He also spoke of how intentionally ambiguous materials could create thought provoking experiences:

"A bit of footage will be very blurred and you will just get a sense of what's happening and it's all about building up your own sort of thoughts about what's happening or what the story is about." (Andrew)

Evolving
The drive to evolve and develop was seen as essential to many of the participants' practices. Andrew spoke of the enjoyment of trying out new possibilities and conversely how something as simple as boredom could compel the VJ to push their work forward.

"The most enjoyable aspect of it is to create new things. It's all about creating new pieces of work, or new elements [...] it's very easy to get bored by a lot of stuff, so it's keeping fresh and keeping new." (Andrew)

New technological possibilities seemed to go hand in hand with the aspiration for evolution. Elliot remarked upon the inspiration he gains from new types of sound reactive visuals for example:

"Oh yeah, I am completely technology driven, I love reactive visuals and I am trying to develop that further." (Elliot)

Meaningful
Significant weight was attributed to the desire for a meaningful performance. Alasdair described how he hoped to create and communicate new meaning by re-contextualizing found footage. Toby recounted a rite of passage whereby the VJ begins to explore something beyond *"pretty pictures"* and endeavors to instill a performance with something deeper:

"After a while you go: 'I am happy controlling this screen for X hours, pretty pictures whatever that I do that I am happy with' and then you kind of go 'ahhhh so what's next?' There are a few different avenues to go down and for me narrative is the most interesting." (Toby)

As highlighted above, the predominant form of meaning discussed was narrative. Interestingly there was an apparent resistance against prescribed or set narratives. Andrew spoke of how he wished to explore the *"random"* nature of a live show to create something that differs from a film. Moreover, Paul referred to intentional disruption of narrative in his practice:

"The really strong theme that's running throughout this is trying to create some narrative in what you are doing; whereas a lot of the stuff I'm actively trying to do is actually trying to fracture narrative as well, and that's where the needle dropping thing comes from." (Paul)

Pride-worthy
The participants spoke of how pride in their work inspired them to produce high quality performances. Elliot described how, despite being able to do just enough to get paid, he always tries to perform at the highest standard.

"You can turn up and be really blasé about it, and just be there just to get a bit of pocket money, but sometimes you really want to be there because the people are watching what you're doing, and your name is on a list on the line-up, and you want people to look at your work and say, 'Hey actually he's quite good!'" (Elliot)

The fear of mistakes, and the resulting degradation of audience experience, was also a key issue. Andrew described how the successful elements of a performance may go unnoticed whilst the simplest of mistakes can make the visuals noticeably jarring to the audience.

Interaction
Methods of interacting with digital technology were particularly prevalent topics of discussion, much of which focused on the effect that particular characteristics of interaction had on the participants' practices.

Constraining Interaction
Technologies which limited the VJ were often discussed in beneficial terms. Constraining interaction was described as playing two key roles. Firstly, it prevented the VJ from

becoming overwhelmed by a sea of possibilities, and therefore provided focus:

"Working in tight knit spaces is really useful, just exploring one small area. I'm never going to explore all of the possible areas but at least I might get somewhere with something." (John)

Secondly, constraints were praised for their function as a mechanism for creativity. For example, in one of Elliot's performances, based around the manipulation of nothing but a white cube, simplicity was said to inspire new ideas.

"I manipulate a white cube on the fly [...] every set it's entirely different, with the same sort of feeling but you know it, you are constantly coming up new ideas all of the time, because you are just working with one white cube." (Elliot)

Haptically Direct

Participants spoke of wanting to *"get hold of"* and *"grapple with"* media. This implies a desire for interaction that provides a sensation akin to being in direct contact or touching and molding media as if it were an artifact in the physical world. Toby noted negatively how the mode of interaction afforded by the controller he uses is disconnected from the video media that it allows him to manipulate:

"I want something that I can directly grapple with the media that I'm dealing with. At the moment I have a planar flight deck of buttons and knobs and that has got nothing to do with video flowing in real time." (Toby)

Paul illustrated an existing device that affords Haptically Direct interaction. He compared how the turntable gives him the sense of touching and feeling the sound in the videos he is manipulating:

"I've got this really gestural interface that is a turntable I can really feel the sound in the video, whereas if you've got something that's plastic, costs about 80 quid and you are trying to, I dunno. You don't get the same kind of feel, experience, interaction." (Paul)

Immediacy

An immediate response to an action was considered essential to many. Paul spoke of plans to move away from the DVS he uses to control video due to the unacceptable latency it introduces:

"The latency, well it's not ideal especially for scratching so I'm trying to move away from time-coded vinyl." (Paul)

Immediacy was also discussed in terms of predictable and modeless interaction. Andrew described how MIDI controllers presented him with a consistent one to one mapping of control that enables a desired function to be found and utilized instantly; as opposed to a generic control device such as a mouse:

"With a mouse and pad, you can do a million things with it but you've got, it changes each time; but you know you can hit a key, or hit the Kaos pad like that, you know what you are going to do straight away and its immediate." (Andrew)

Manipulable Media

A desire for powerful and varied manipulation of media was evident from the participants' comments. Toby, for example, stated a desire for as much control as possible:

"The key thing is, giving yourself the maximum potential for effecting and controlling what you want to do." (Toby)

In relation to this, participants showed frustration with media that requires rendering prior to, but is immutable during, performance. This illustrated how the participants wanted to manipulate their materials at the microscopic level as opposed to simply collaging clips. Interestingly, there was much discussion of devices that mimicked audio-synthesizers:

"We need something like synthesizers, you know electronic synths. When synths came through, like drum machines and things, you were creating things on the fly; you were creating things from nothing really." (Andrew)

Such devices would allow new content to be generated during a live performance and as such break away from the restricted manipulation associated with rendered sequences of video clips. Finally, Paul discussed his desired manipulation in terms of granularity, stating that the low frame-rate of video made his attempts to control it with small, nuanced, gestures futile.

Parallel Interaction

Parallel or concurrent interaction was seen as an important aspect during a performance. MIDI controllers were mentioned as exemplifying such parallel interaction:

"I need to bring down 10 different things at a time, when I perform I can have two cross faders instead of one that do two slightly different things, and I can only do that with external physical controls." (Toby)

Conversely, Toby warned that parallel control was only beneficial to a certain degree; the performer may not have the physical or mental capacity to interact with too large an array of controls:

"I have 20 buttons, 8 sliders, a few knobs, um, a few rotary controllers, and I only have ten fingers and two hands, and I can only think about so many things at the same time!" (Toby)

Reconfigurable Interfaces

The ability to reconfigure interaction to suit a VJ or a particular performance was said to be important. For example, Toby described a hardware device that consists of physical controls that could be laid out in any configuration:

"It gives you Lego blocks which are the controller bits, so you can literally go 'I want three sliders in a row, and I want this button, and I want that' and so you really can lay

it out. And then you just close your suitcase and turn up. It really did seem like the perfect thing." (Toby)

Reconfigurable interfaces were not just referred to in the context of hardware prototypes. Alasdair described how the interface of the desktop VJ program he uses (Resolume [28]) could be to be tailored to suit his practice.

Visible Interaction

Participants believed interfaces or controllers should be manipulated in such a way that the performer's interaction is visible to the audience. Alasdair described how the visibility of interaction with a controller is essential, even if visibility doesn't equate to an understanding of that interaction:

"If you are on stage they will see you doing something; you know they will see you playing a keyboard or interacting with an interface or whatever. Whether they understand that what you are doing is live visuals, in the context of a band I mean, I guess that doesn't really matter, as long as they are seeing you on stage performing, and they get a sense that something special is happening" (Alasdair)

Toby hoped the audience would not only see, but understand, his interaction. He envisioned a future technology that would externalize the decision process that guided his interactions:

"If we had an interface that was, that really was transparent to the audience, in the sense that your actions, your decision process, everything like that is as obvious to the audience as it is to you as you kind of go through it; then absolutely you have a very compelling reason to be on the stage." (Toby)

Live

The final thematic category notes the importance that the participants placed on their performances being live events. Situating the presentation of visual media in a live context was described as having a range of consequences that set the act of VJing apart from other forms of visual media such as film.

Improvisational

A live performance was described by the VJs as providing the opportunity to experiment and improvise with the creation and manipulation of visual media. Improvisation was described in wholly positive terms by participants who associated it with satisfaction, interest, play and artistic freedom:

"There are lots of opportunities to be quite improvisational, which is a good thing because it's quite satisfying and gives you a sense of artistic freedom" (Alasdair)

Digging deeper, improvisation appeared to be more than a satisfying and interesting trait of a practice but rather a mechanism for creativity inspired by the performer's exploration of his aspirations and materials. Participants spoke of how the act of experimentation would inspire

ideas in the moment and future directions in a practice as a whole:

"So with my live cinema piece, which is basically an hour long, say, I basically performed that for about eight hours straight, and tried every combination with everything else, with all these different things, you know, and discovered a thousand things that I never would have come across if I was a film-maker." (Toby)

Responsive

Participants described how a live performance allowed them to incorporate a range of stimuli from the environment into their practice. These included the music played by a DJ, live camera feeds, and active participation from the audience. This concept was of particular importance to Elliot who described how the incorporation of the environment into his performance is the key reason for the VJ to play live:

"The argument about why it is live, should you 'press play' has been raging essentially forever, and it will continue to rage, but before we couldn't do this live feedback, the event back into itself that we can do now, and that puts VJs centre stage and gives them a reason to be there." (Elliot)

Unique

Andrew spoke of how playing live made each performance a unique event that is different for each audience. He associated the unique element of performance to both of the aforementioned factors of live improvised manipulation and responding to the performance environment:

"If the elements that you are doing are controllable by the environment you are in some way [...] it gives some feeling of specialness, or one-off-ness, or individualism." (Andrew)

He also spoke of the personal significance of a performance that is presented just once to an audience:

"This is our thoughts, this is our ideas, this is the thing that we are trying to convey; and it's almost like telling a story or telling something... you tell a story to someone in a pub and then you tell someone else, it's always going to be different, almost that personal thing." (Andrew)

FURTHER INSIGHTS FROM CREATIVE RESPONSES

The *Creative Response* phase of the workshop lead to insights which further developed the themes of expressive interaction among VJs. Four short videos were created that each responded to one of the vignettes. Each response was created by participants featured in the corresponding vignette; as Andrew was featured in two of the vignettes he contributed only to the 3D Disco response. Three of the responses were short re-edits of the footage from our film, whilst the Kinetxt response was an ad-hoc performance. In the following sections we describe each of the responses, alongside the rationale that the performers provided, and present a brief analysis of how they clarify, contrast, and extend the themes defined in the previous section.

3D Disco

The 3D Disco response begins with footage of the performers preparing audio and visual material in their studio. The performers are shown quietly concentrating at their laptops whilst a heartbeat like rhythm plays in the background. These scenes continue for nearly two and a half minutes until the final 40 seconds of the response where footage of the performance is shown. When discussing their response Andrew and Elliot commented that by creating an imbalance in the footage of pre-production and performance, they hoped to emphasize the hours of work that are spent preparing materials compared to the relatively short duration of the live show. Andrew attributed this to the anaglyphic visuals, which must be perfectly produced in order for 3D effect to work.

By commenting upon the imbalance of manipulation between pre-production and performance, the response stresses that the limitations Andrew and Elliot face in terms of *Manipulable Media* are rooted in the format of the visual materials which they utilize rather than, say, methods of control. Furthermore, the response demonstrates that, despite these limitations in terms of manipulation, the performers are able to achieve their goals of a *Pride-worthy* piece that is *Evocative* of audience enjoyment. Hence, the response suggests that for the VJ's interaction with digital technology to be expressive, it need not embody all of the themes defined in the previous section. Rather, an appropriate combination or selection may suffice.

Electro-Flamenko

The response commences with shots of musicians and dancers alongside Alasdair as he performs. Over these scenes Alasdair speaks a monologue that describes his desire to share the links between sound and image, which he holds in his mind, with an audience. Following this, a two minute sequence of visuals is played. The visuals quickly skip and loop in synchrony along to the sound of a recording by Electro-Flamenko. Alasdair stated that the first half of the response captured the different strands of music and dance that together with his visuals entwine to produce the Electro-Flamenko performance and as a result illustrate what it means to VJ in a live band. He described the second half as a live demonstration of his work and stressed the importance of it being produced with only the tools he utilizes in his actual live sets. He hoped that this would express how essential it is that his work is live and how he could never *"just turn up and press play"*.

The response presents a new perspective from which to consider the concept of a *Meaningful* performance. Prior discussion noted that performances may be augmented with meaning such as narrative to make them more interesting and conceptually meaningful for the performer. Alasdair's monologue however suggests that the communication of links between sound and image is an activity otherwise impossible without participation in VJ practice. Hence, the externalization of meaning may be a much more central

driving force for expressive interaction in VJ performance than first thought.

Kinetxt

Toby presents a short performance of Kinetxt on his laptop. The Kinetxt environment is configured to present passages of a script, which Toby reads as they arrive on the screen as contributions from an imaginary audience. Initially the passages describe the desire to create a show that embraces the environment and the moment of the performance and as such create something that is *"beyond broadcast"*. Next passages are spoken, from the imaginary voice of Kinetxt, that talk of its existence as an entity or actor that creates an immersive environment by responding to the audience, the performer and the drawings of graffiti artists. Toby stated that, as Kinetxt is an experimental live performance, he made the response in an experimental and live way. He described Kinetxt as a *"story telling experiment"* and said that if Kinetxt cannot tell its own story then somehow he and Andrew fail.

Toby's desire to perform an instance of Kinetxt, rather than re-edit one captured on film, suggests that he believes to truly understand Kinetxt one must witness it in action as it facilitates storytelling in response to the environment it inhabits. This suggests we must consider the theme *Responsive* in a new light. Rather than just providing new sources of inspiration, the incorporation of environmental aspects into a performance may instill it with contextual significance and meaning that distinguishes it from any form of recorded practice. Moreover, this suggests that a *Responsive* performance may go hand in hand with a *Unique* one.

Tron Lennon

Throughout the response short sounds play and loop in tandem with video clips of both John and Paul manipulating their instruments and controllers. At points the sound stops and footage of the pair speaking about the turntable as a tactile controller is shown. At one point visuals are scrubbed through in time with a video of a Paul's hand scratching a record. The response concludes with a clip of a man speaking about the unison between the sound of his speech and the moving image, throughout which the audio is out of sync. Paul emphasized the importance of tactility in their performance through the response. He hoped that footage of interaction with his equipment cut with simple movements and fades of visuals would illustrate his desire for a mapping between physical gesture and video. John hoped that by looping short video clips and sound samples together he could demonstrate his desire to create rhythmic patterns of video as he does when improvising with audio.

Paul and John's response highlights a desire for controllers that afford a strong relationship between physical gesture and manipulation of visual media. This is referred to as tactility and relates to the notion of *Haptically Direct* interaction. The most interesting aspect of the response was the choice to utilize the video editing equipment to mock-up the forms of interaction that were desired, but not yet

possible, with video. For example, physical gestures tightly synchronized with the manipulation of video demonstrated the *Immediacy* and *Visible Interaction*, that although present in the pair's audio practice, were thus far unattainable in the visual arena.

DESIGN IMPLICATIONS

Our account of expressive interaction relates to abstract characteristics of the relationship between VJs and interactive technology. In order to guide those wishing to design in response to our findings we discuss our results in terms of relevant techniques and theories from the literature.

Tangible user interfaces (TUIs) bridge the gap between the intangible bits of a computer and the perceptible atoms of the physical world [14]. Consequently, TUIs would seem to naturally lend themselves to the realisation of *Haptically Direct* interaction. By giving the underlying content of a VJ performance a tangible manifestation, the feelings of holding and grappling with media may be attained. Furthermore, TUIs strive to replicate the natural union of physical gesture and effect that we find when manipulating physical objects. Wensveen et al. describe such interaction as being *"naturally coupled"* and note the effect where results, and feedback, occur instantaneously alongside an action [33]. Hence, TUIs present an interesting avenue of exploration into the realisation of *Immediacy*. Additionally, the visible relationship between physical action and effect afforded by such naturally coupled interaction makes the manipulation of TUIs highly conducive to *Visible Interaction* [13].

Interfaces based upon metonymy [1] move away from the abstraction of interface metaphors. As a consequence, they allow users to better understand the relationship between their action and the underlying function of a system. For example, a musical synthesiser based on metonymy would allow the user to directly manipulate a waveform as opposed to clicking a virtual piano key. If we consider *Haptically Direct* interaction not in a physical sense, but in terms of probing an object's characteristics, metonymy arises as a compelling design option. By exposing the underlying qualities of software, metonymy may allow the user to sense and *"grapple with"* them in a virtual context. Hence, an alternative approach is suggested for realising a sense of *Haptically Direct* interaction suited to the case where the direct association of underlying software functionality with physical form (of the TUI) may be inappropriate or impractical.

Shneiderman proposed that interfaces that support creative users should have *"high ceilings and wide walls"* [31]. That is, they should provide the user with a wide range of functionality which is complex enough to permit skill development amongst advanced users. Similarly, discussion of electronic musical instruments and interfaces highlights that limitations imposed on skill development are unacceptable [34]. The theme *Manipulable Media* supports

this proposal and suggests that when designing for the VJ it may be appropriate to provide a more complex space of control possibilities. McCullough describes such interaction in terms of *"density"*, and envisions control where *"between any two states there exists still another"* [19]. The value of providing an un-bounded space of control is however questioned by the theme *Constraining Interaction*. Participants noted how too large a space of possibilities could overwhelm, and limitations were in many cases useful features that give rise to creative acts. As such the VJ may benefit from complex interaction possibilities that are contained within a well-defined space. *Reconfigurable Interfaces* (e.g. [12]) pose an interesting method for the provision of both *Manipulable Media* and *Constraining Interaction*. If the user is presented with a complex space of manipulation possibilities, but is able to reconfigure the interface to voluntarily impose limitations on that space, they may find a personal balance that affords both complexity and constraint.

We return to the definition of expression given at the outset of this paper: *"the action of making known one's thoughts or feelings"* [22]. The theme *Improvisational* suggests that it is essential for the VJ to partake in a practice for it to develop. Therefore we consider *"making known"* not only to refer to the communication of ideas to an audience, but rather their formation and development through practice and experimentation with interactive technology. McCullough [19] describes how a craftsperson must participate in a practice to develop a relationship between their expressive intent and their materials. If we look at our results though such a lens, expressive interaction among VJs can be considered as a dialogue through which, over time, the *Aspirational* elements that underpin a practice are given form in the context of technology. Hence, designers may do well to consider work such as that by Hallnäs and Redström which explores how artifacts develop a longitudinal presence in the life of the user [10].

DISCUSSION

Whilst many of the techniques utilized in our methodology are well established, our *Creative Response* activity is novel and as such we reflect upon its application. Participants primarily utilized the responses to reflect on a single or small number of issues. As opposed to the Focus Group, where discussion could quickly dart between topics, the *Creative Response* required a sustained period of engagement in order to produce a video artifact. Consequently, participants were pushed to prioritize issues and therefore regard only the most salient in terms of their practice. As a result of this more involved stance, we found participants tended to broach their personal relationship with the issues at hand. Alasdair, for example, utilized the response to elaborate upon his individual interpretation of meaning in a VJ performance. A particularly interesting, yet unexpected, consequence of the method arose as John and Paul used the response to give form to future aspirations for their practice. In this case, the *Creative Response* afforded a

means of experiencing aspects of a practice that have yet to exist.

The *Creative Response* method may prove to be a valuable mechanism for exploring creative practices are not video-based. Video can capture actions and effects of a practice and as such could form the basis of an engaging reflective activity even if the focus of expressive interaction is a different medium. In this case however, the creative skill and experience of the participant with their medium will not be directly leveraged in the making of the response. Therefore, it may be necessary to adapt the method for each use-case, so that the participant may express their response to using the medium of their practice; for example a musician with music or a sculptor with clay.

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