

Design in Action: Unpacking the Artists' Role in Performance-Led Research

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Figure 1: Performing with the ChameleonMask.

ABSTRACT

This paper illustrates design work carried out to develop an interactive theater performance. HCI has started to address the challenges of designing interactive performances, as both audience and performers' experiences are considered, and a variety of professional expertise become involved. Nevertheless, research has overlooked how such design unfolds in practice, and what role artists play in exploring the both the creative opportunities and the challenges associated with digital technologies. A two-day workshop was conducted to tailor the use of an interactive mask within a performance. The analysis highlights the artists' work to make the mask work while framing, exploring and conceptualizing its use. The discussion outlines the artists' skills and design expertise, and how acknowledging them reconfigure the role of HCI in performance-led research.

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CCS CONCEPTS

• Human-centered computing → Empirical studies in HCI.

KEYWORDS

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1 INTRODUCTION

This paper presents design work carried out during the production of an interactive theater performance planned to be staged at the Royal Dramatic Theater in Sweden. The production was based on *Insider*, an award-winning video game, and was to be set in a multi-storey warehouse in a local, meat-packing district under renovation. The design work aimed at exploring ways to tailor and re-purpose the use of the ChameleonMask [24, 25], a telepresence technology, within an artistic setting. As interactive technologies have increasingly become constituent components of artistic performances, HCI research has investigated creative ways to interweave them in such

productions and explored the role they can play for audiences and artists alike [35]. Under the umbrella of performance-led research [4] artists' skills and expertise have been regarded as central to these creative design processes. Although in-depth and valuable, this body of work mostly focuses on the final performances, overlooking the details of how design processes unfold in practice and the artists' role in them. We see potential here for performance-led research to extend its focus to the artists' situated, in-situ practices and design efforts in these kind of settings.

Previous work [1] has illustrated that actors spend a significant part of rehearsal to learn to act with specific technologies or ignore its seams when performing with it. Relatedly, Hook et al's [14] work on ideographic design reveals the ways close collaborations between a single artist and designers effectively work to address specific aspects of experience in design. Furthering this body of work, this paper focuses on the early stages of designing an interactive performance, in which actors are involved not only as users of the technology, but as equal design partners in re-designing and re-purposing a technology into a new setting. From a performance-led research point of view, there's a gap here to understand the actual hands-on, moment-to-moment interactions of collaborations between artists and researchers in developing such productions. Studying and understanding the details of these collaborative design processes is instrumental to HCI to inform methods and approaches to design technologies for such domains and, importantly, to re-frame assumptions about to conduct this type of design.

This paper illustrates how artists' professional skills and expertise – actors', theater directors', scriptwriters' and producers' – are essential to develop elements of the performance (e.g. narratives, body interactions and emotions), while also being "design" skills to interweave the technology in the interactive performance. We refer to these overarching efforts as *the work to make the mask work*.

Previous work has identified artists' challenges in rehearsing with not yet ready technologies in interactive performance experiences [1]. Exploring the use of a fully working prototype makes such experiences concrete, while providing opportunities to reflect and redefine core elements and relationships within the performance. Moreover, envisioning the appropriation of existing technologies within artistic experiences is instrumental to deal with the real world-constraints of the overall production. Through our own engagement with interactive performance research [1, 8, 33, 35–37], we are familiar with the artists' economic limitations and time constraints of delivering real world productions, which oftentimes result in the lack of resources for new developments. We see the exploration of existing technologies as a realistic and practical design strategy that artistic endeavors could potentially adopt. The design explorations discussed are instances of technology-inspired design [14] or technology-driven innovation [26] where a working technology is the starting point of the creative processes.

The findings show reveal the creative team's considerations to align the interactive mask with narrative purposes, as well as with meaningful interactions between actors, and between actors and audience members. Our findings outlines that reflections, stemming from what HCI would label as 'design expertise', are profoundly rooted in the artists' professional visions and skills to develop theater performances. Drawing on the richness of the artists' expertise

at the workshop enables reflections on the role of such expertise in HCI in general, and in performance-led research more specifically.

The paper is structured as follows. We first introduce related work on interactive performance within HCI and telepresence technologies to define a backdrop for our work. Next we introduce the methods used in the study. In the analysis we present a number of episodes illustrating the various levels at which the artists sought to interweave the ChameleonMask into the performance. In the discussion we highlight: a) the artists' professional skills to create design-oriented understandings of the challenges they faced, b) how starting with a fully working prototype was a productive way to engage with details of the design, and b) reflections to reconfigure and rethink the roles of researchers, artists and designers in HCI and performance-led research.

2 BACKGROUND

This paper draws on two strands of related work: HCI research on designing interactive performances and work on telepresence technology.

2.1 Interactive performance and HCI

HCI research on interactive performance has extensively studied the potential of interactive technologies in providing creative opportunities for audience participation [5, 8, 19, 33, 37] and interactions between artists and audience members [36, 37, 40]. Collaborations at the intersection of computer science, design and performing arts have contributed theoretical frameworks and design methodologies [3] and brought attention to the aesthetic and emotional aspects [23] of designing for such settings.

Although diverse, these studies mostly focus on the audience experience of digital technology, and few investigations have drawn attention to the artists' experience of using technology, either during design or in final productions [1, 10, 11, 36, 40]. Reeves et al. [32] have outlined a number of strategies to design interactive interfaces for spectators' experiences. Their work illustrates the ways performers can manipulate and tweak interactive systems, for example by movement and sensory inputs, to create specific effects within the experience. Relatedly, Fdili Alaoui [11] has reported on the processes of designing an interactive dance performance and discussed the artists' appropriation of technology within it. A key finding of this study is that artists' interactions with the technology, and expectations about it, are adjusted to accommodate technological constraints, and such constraints can, in turn, provide expressive opportunities for the overall performance. Digital technology is thus not a mere tool for interactivity, but a means to provide different expressive and aesthetic opportunities for the performers. Eriksson et al. [10] further contribute to this body of work by presenting the case of a live dance performance with interactive drones. In this study, the dancer had to adjust her body movements both because of aesthetic reasons and the practical concern of being track-able by the drone's sensor. This research also discusses the ways the drone had to be reconfigured to make it expressive in relation to the performer's actions. Another study [34] has investigated musicians' initial encounters with a working prototype of a smart guitar. The findings illustrate the musicians' sense of agency associated with

the instrument and their efforts to control it by adjusting their body movements.

Relatedly, a body of work has investigated performers' experiences of remote theater, and the technical challenges related to liveness in geographically-distributed performances [1, 18, 42]. For example, Kaiser and colleagues [18] have reported on the technical considerations involved in developing an audio and video communication infrastructure for a remote theater production. Their study shows that the remote actors became accustomed to the latency of the audio and video transmission, and developed acting strategies – such as adapting the timing or precision of certain movements – to create a sense of liveness in the distributed performance. In an ethnography of rehearsing practices in two theater productions, Barkhuus and Rossitto [1] have illustrated the strategies that actors adopt to ignore the seams of technology meant to enable audience participation, or for learning to act with digital technology that will be integrated in the final production, but not yet available for rehearsal.

A line of research on interactive performance has particularly focused on the collaborative processes between HCI and the performing arts [3, 4, 9, 16] resulting in the development of the performance-led research framework. [4]. By centering on design activities, performance-led research puts artists at the center of research. Within this approach, artists play a fundamental role in developing sociotechnical visions, and in orchestrating and executing design processes. Although performance-led research sees design through a practice lens [4], most studies lack investigations of moment-by-moment interactions of how artists curate technologies in artistic settings, and the ways creative practice unfolds in concrete situations. This paper addresses this specific gap by illustrating the work of a team of artists as they seek to orchestrate technology through sketching and designing different aspects of an interactive theater performance. Extending previous research on the artists' experience of using technology [35, 36], the present study sheds light on the artists' design skills and the interplay between efforts to design the use of the technology, and central elements of the performance, such as the narrative or the actors' role in the story.

2.2 Telepresence technologies

Telepresence technologies have extensively been studied by HCI research in theater and performance settings [17] and application areas as diverse as remote participation in classrooms [15], conferences [29] and meetings [2]. Telepresence research goes back to early explorations of video-based technologies, and audio connections, to facilitate collaboration between geographically distributed co-workers, and to support informal interactions in public spaces and working environments [6]. Early efforts were mostly based on designing interactions between remote spaces through the use of shared screens in public spaces and the broadcasting of live video [17, 43]. These systems were mostly centered on video streaming participants' physical interactions as they moved in front of the camera [6]. With the advances of network connectivity and mobile computing, the use of video-based telepresence technologies has expanded to private or mobile settings [21, 27], thus providing opportunities for interactions in various contexts [27] [30]. More recently, echoing the interest in telepresence robots in educational

settings [39], research has focused on the embodied presence of remote participants. Related work has reported on the use of telepresence robots during academic conferences [28] and identified the appearance of the robot [38], its height and point of view [22] and the quality of audio feedback [31] as critical design challenges in creating a sense of 'being there' for users of telepresence robots.

Of particular interest to our study is research on *Human Proxies* [15] and the *ChameleonMask* [24, 25] in which the telepresence robot is replaced by a human body; wearing a display to live broadcast remote participants' this body acts as a proxy, a surrogate of the remote user. As the remote participant can direct the surrogate to perform tasks, ask questions or attend social gatherings, a key aspect in this work is the negotiation of interactions between the remote participant, the proxy and the environment it inhabits. Differently from telepresence robots, human beings can act on their own. This can create challenges in interacting with the physical environment and people present (e.g. asynchronous movements or laughter), but also provide novel expressive opportunities for both remote and surrogate participants. This paper illustrates the tension between such international challenges and the creative opportunities that emerge from interweaving the *ChameleonMask* into an interactive theater performance.

3 METHODOLOGY AND SETTING

The empirical work was carried out through a performance-led research approach [4]. This entails a set of creative design methods and processes led by artists, rather than being primarily concerned with artists/users' experience of digital technology. Pivotal to performance-led research is the central role of the artists in formulating artistic and design visions and shaping the forms and contents of the creative process. In performance-led research, the researcher's role is primarily to help realize the artists' vision, study the processes and outcomes of design and generate theories to help advance the study and design of future performances. Resonating with its core tenets, the adoption of performance-led research for our study was motivated by the goal to adopt and adapt the *ChameleonMask* within an interactive theater performance, to develop an artistic vision that would frame its use, and to highlight practical concerns, unexpected roles and values to be addressed by the creative team. We have given the participants pseudonyms to preserve their anonymity in the quotes. We have also blurred one of the artists at their request.

3.1 The technological setup

The *ChameleonMask* system consists of a helmet with a smartphone attached to the end of the arm, a processing PC, and an head-mounted display (HMD) with a tablet attached to the front of the helmet (Figure 2). To be operable, the mask requires two users to be assigned to it, user A (the remote participant) and user B (the surrogate). The system operates as follow: user A's face is captured and then displayed on a tablet that is worn by user B. The communication is facilitated through a smartphone with a camera attached to a helmet. The streaming video is then transferred to the PC via a HDMI capture device. The smart phone is also used to help user A, see user B's point of view (POV) using the fish-eye camera installed on user B's tablet. The live streamed video is also fed to

user B's HMD, to help the person see the environment and walk freely in the physical space. The video transmission happens in real time and is sent through a wireless LAN with almost no latency at all. During the workshop, an iPod touch, an iPad Pro equipped with a fish-eye lens, an Oculus Go HMD and a RAZER Blade (as the processing PC), were used to set up the ChameleonMask.



Figure 2: The ChameleonMask set up. The remote participant, users A, can be seen on the right side of the picture. The surrogate, user B wearing the mask, is displayed on the left side.

3.2 The artistic vision

The artistic vision behind the interactive performance was inspired by an award winning computer game called *Inside* by Playdead¹. The game is a puzzle-platform adventure game in which the player controls an unnamed, faceless character that moves through a gloomy environment rendered in a 2.5D fashion. The aesthetics of the game evokes a surreal and dystopic setting: the game uses a dark color scheme, both outdoor and indoor environments are bare, while other human beings are represented, and move, as shadows. The game has only limited sound, with a few musical cues and effects to highlight certain things in the envisioned dystopian future. The player controls the character to walk, run, swim, climb, and overcome obstacles during what seems to be an escape from somewhere. To end the game, players are supposed to help the character deactivate the glowing orbs in every room of the environment he navigates.

The game was a source of inspiration for the artistic team to create a site-specific performance, in which the audience could move between different rooms as part of the experience. The decision to explore the use of the ChameleonMask within this production was made when the production team – made up of a producer, a director and a dramaturge – learned about the technology from the first and second author – this happened in May 2019, when the production work had already begun. The artists saw great potential in the mask as it resonated with the vision of a story whose main character is faceless.

¹<https://playdead.com/games/inside/>

3.3 Data collection

The empirical data were collected over a two-day workshop carried out in October 2019, and organized in the context of the newly established collaboration between Stockholm University, the University of Tokyo and the Royal Dramatic Theater in Stockholm (Sweden). Data included observation notes, video recordings of the activities carried out during the two days, as well as the scripts of the scenes that were developed before and during the workshop. A total of ten people took part in the workshop: five HCI researchers and interaction designers, a theater director, a dramaturge, a theater producer and two professional actors. The combination of people provided the variety of experience and professional expertise that is central to designing interactive performances. The different backgrounds were, in fact, essential to understand emerging relationships between the technology and acting practices, between the technology and audience members, and to envision scenes and plots in relation to the role technology could play in them.

With the exception of two of the researchers, the workshop participants were not familiar with the technology setup and had only experienced the mask indirectly, through available video material, online documentation and previous publications. Only the producer, the dramaturge and the theater director were directly involved with the production of the interactive performance, while the actors' participation was limited to the workshop to which they had been invited by the producer.

The workshop was held in one of the rehearsal rooms at the Royal Dramatic Theater and the agenda was co-created by the first and second author together with the theater producer. This ensured that both technological and artistic concerns would be addressed during the planned activities. When the workshop was being planned, the interactive performance was still in its early stages of design and scheduled to be premiered in the spring of 2020. Thus, the workshop was not a mere research exploration, but a real work context for the artists who utilized it to create concrete sketches and scenes of the theater performance.

3.3.1 Day One. On the first day of the workshop, activities were organized in three main moments: i) introducing and exploring the ChameleonMask, ii) brainstorming possible scenes and plots that could define – and be defined by – the use of the mask iii) debriefing and planning activities for the following day.

The workshop started with a round of introduction where all the participants introduced their professional interests in the workshop, and the goals for the two days were set. This was followed by a forty-five minute technology demo. After an introduction of the ChameleonMask, all the participants had the opportunity to try-out the mask and explore the technology as they liked (Figure 3). This phase was lead mainly by the researchers who provided the production team with answers about technical specifications of the system and its technical capabilities. During this phase, the actors took up a very creative and active role that related their performing skills to the digital technology. While wearing the mask, they drew, for instance, on their acting experience to explore how they could make eye contact with other actors. Their exploration centered on making sense of the mask and how it could be used to point in a specific direction the remote actor's gaze, or how potential audience members would see their face displayed on the ChameleonMask.

These considerations led to the second phase of the workshop activities, which were focused on brainstorming interactions, scenes and plots. This phase started with the dramaturge and the theater director introducing the script of a central scene of the performance, which they had previously drafted for the workshop. The script was read aloud and shared with everyone, thus providing initial insights on how they envisioned the performance. The reading was followed by a brainstorming session that was more narrowly focused on the use and the role of the mask in the specific scene. Although it was still unclear whether audience members or actors would wear the mask, this discussion outlined several possibilities to introduce the mask into the performance. One of the ideas considered - which we also document in the analysis - focused on the reasons for wearing the mask: putting the mask on was seen as a way to "upload" a consciousness (e.g. the remote actor's consciousness) to an audience member.

The last part of the day was devoted to reflecting on the day's activities and what each one had learned from the technological and artistic explorations. At the end of this session, the dramaturge and the director decided to revise the script and focus on three alternative scenes that would provide a ground for further exploring the use of the ChameleonMask on the following day.

3.3.2 Day Two. The second day started with one of the researchers briefly summarizing the previous day, particularly what had worked well and what required more attention and focus. Afterwards, the production team took the lead by introducing the three scenes that the director and the dramaturge had sketched for the day's activities. These scenes were then used by the actors as a starting point to brainstorm and play out possible ways in which the mask could be used. These scenes were all centered on the premise that the mask would be positioned horizontally on a flat surface - e.g. a bed. As audience members approach the mask, the face (the mask displaying the remote actor) would speak, trying to convince them to pick the mask up and wear it. Following up, three plots were suggested with scenes broadly sketched by the director and the dramaturge with the intention to keep them open to explorations beyond the suggested story-line. The first scene explored the interactions and relationships between a remote actor and possible audience members based on the idea of giving and receiving orders while searching for a mine to be defused. The second scene focused on the narrative opportunities stemming from the mask. In this regard, a dialogue between the mask/remote actor and an audience member was envisioned as a way to establish a connection before audience members put on the mask. Finally, the third scene was introduced as a multi-audience experience, with two remote actors guiding two audience members helping them come together for a rendezvous.

While illustrating possible roles of the ChameleonMask in the performance, working with these scenes triggered in-depth discussions on the differences and similarities between acting with the ChameleonMask and with traditional theater masks. The actors referred to clown techniques and mask work as ways of acting with a mask in traditional stage theater. These issues were particularly interesting for the artists and it was thus decided to add an activity

to the workshop whereby traditional theater masks² and clown-acting techniques were used to discuss embodied aspects of acting with a mask.

3.3.3 Data analysis. The data collected were iteratively analyzed using thematic coding [7] and video-analysis [13]. The field notes formed the basis to identify main themes and categories that were triangulated and addressed by delving deeper into the video material from the workshop. Three collaborative sessions were carried out to scrutinize the videos in more detail and identify a number of episodes that would be analyzed in-depth. Thereafter, the first author further analyzed the video material. Relevant episodes were transcribed and themes concerning the ways the artists sought to make sense of how the ChameleonMask mask would work in the performance were identified.

4 MAKING THE MASK WORK

The following sections delve into the creative team's explorations and discussions on the work to "make the ChameleonMask work". The design process can be characterized as a technology-inspired design strategy [14], whereby the creative team seeks to repurpose the mask in the context of an artistic experience. The findings illustrate the challenges of combining functional aspects of the technology with subtle issues of experience and interaction, such as the emotional and expressive aspects that are central to acting. The first theme, *Making sense of the mask*, focuses on the duality of the actor created by the mask. Conceptual and practical explorations of who the actor is - the one wearing the mask, or the one whose face is displayed on the iPad - are central here. The second theme, *Entering the mask*, expands this aspect by addressing issues of narrative perspective, i.e. the point of view from which the story unfolds. The third theme, *Interacting with the mask* illustrates how conceptual design considerations are tied together with concrete efforts to design the performance. The last theme, *Acting with the mask* brings attention to implications of acting with the ChameleonMask, particularly issues of embodied interactions, such as gaze and body movements. The analysis is based on the creative team's discussion of a scene in which an audience member enters a physical room and sees the ChameleonMask placed on a bed. A face of a sleeping person is visible on the screen of the mask. The core idea of the scene is that a voice - possibly the remote actor's voice acting as the sleeping person - will ask audience members whether they are willing to pick up the mask and put it on, thus lending their body to the person in the mask. The act of "uploading the mask", as it was defined by the creative team, works as a narrative device for audience members to become the body of the consciousness and help her fight the dystopian society that, echoing the game *Inside*, was envisioned as the backdrop for the narration. Reporting the whole scene falls beyond the scope of this paper. Below we introduce the part which much of the much of the discussion stemmed from.

"Lift me up and put me on your face. Can I borrow your body? Do you think tomorrow will be better than today? I know its a funny question and I understand if it is hard for you to answer. But maybe you do

²The traditional masks were intended to be used as props and had been brought to the workshop by the artists.

know the feeling that something is wrong, without knowing what it is. But you feel it, especially when we talk about the contemporary and future prices and catastrophes. When we tell each other that we should do something more, being engaged to change, and then continue as before anyway; that is how it feels, maybe it is that feeling of “latent” anxiety, as a feeling that our eyes have wondered out on the side of our heads so that they can follow everything, see everything that is going on”.

The scene continues with the voice echoing the vision of a dead society, where nothing is how it is used to be, and where new values and actions are needed. As a call for action, the voice then asks audience members to give up their bodies and become the person in the mask:

“You know a society on its diseases, every age has its own paradigmatic sufferings, and the dominating disease when I left this world was depression, is depression a chemical imbalance in your brain, is it a biological or socially determined disease, is it a nerve problem, is it a black gal [?] of melancholy, or is it a completely normal and healthy reaction to a sick society, the only way is to kill your body and follow me, would you do that, follow me and become rid of your body, here everything is different it is difficult to explain to an earthly person, but place yourself in front of me, type in your name, your birth data and the words you want to be written on your gravestone.”

4.1 Making sense of the mask

The reading of the scene by the dramaturge triggered an intense discussion among the artists on the role of the masks in the performance. One of the first issues to be scrutinized was, for instance, the reconfiguration of the actor; questions were raised on the person who is actually acting: the one wearing the mask (the surrogate), the remote character whose face is displayed on the screen, or an hybrid of the two. The artistic team talked about the ChameleonMask as creating a three-parted split of the actor, which they loosely characterized as “a head”, or sometimes “a face”, “a body”, and a “mind” or “consciousness”. These working concepts provided a backdrop to further address the role that the technology could play in the artistic experience being envisioned.

As the team continued to discuss the different ways in which a remote actor could convince an audience member to put the mask on, the conversation focused on the relationships between the actor wearing the mask and the actor on the screen. This discussion was instrumental to realize that the technical features of the mask *blurred* the actor: was the actor the person wearing the mask on the stage, or the one behind the scene, visible through the screen? Inquiring on the ways the mask created what they called a “split” between the face appearing on the screen, the body of the person wearing the mask, and the voice broadcast through the mask, worked like a *conceptual elaboration* in further conceiving how the ChameleonMask would reconfigure the scenes and the narrative under development. Inquiring and exploring thus became core aspects of the process of considering how to design the dialogue and

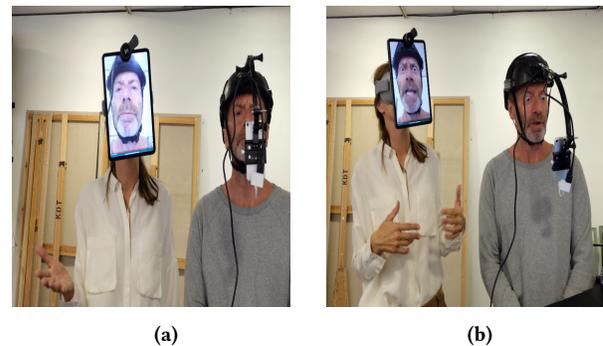


Figure 3: Explorations of the ChameleonMask through facial and expressive play

write the script. Fundamental questions such as “who is speaking on behalf of who” and concerns about how to express emotion, became a form of device in sorting out how features of the technology would allow for certain forms of acting, narration and audience participation.

A central quality of this discussion was the creative team’s ability to reflect on how main roles, such as actors – and relations between them – are redefined by the introduction of the interactive mask. By drawing on their professional experience, and reflecting on the interactive qualities of the mask, the discussion quite soon addressed the impact the technology would have on consolidated practices such as acting. This was explored both in terms of constraints and creative potentials. The artists used their *skills of inquiring and conceptualizing* to understand how the technology created interruptions to their common ways of conceiving of relationships between actors, as well as between actors and the audience.

4.2 Entering the mask

Probably influenced by the introductory exploration, the production team initially talked about the ChameleonMask in fairly simple terms: it was regarded as “merely an iPad” strapped onto one’s face. However, through explorations of possible ways to tailor its technical qualities to the scene described above, a number of concerns about the emotional aspects of the scene surfaced. Since the mask turns the human face into “an iPad face”, or simply “this voice”, the director and the scriptwriter extensively reflected on ways emotions, such as love or friendship, could be expressed. The emotional aspects of the scene were particularly important in that inner states like depression, and even the willingness to “kill oneself”, featured in it. The conversation below illustrates how the director and the dramaturge started to make sense of such issues:

“iPad starts talking to you, is having intimate conversation about his or hers depression, tries to seduce the audience to upload to kill oneself”. (C, Director)
 “How can you have an intimate relation to an iPad face?” (A, Dramaturge)
 “How do you become good friends with this voice, and who is speaking on behalf of who?” (C, Director)

While delving into the challenges of convincing an audience member to pick up the mask, the artists drew on their professional

and personal experiences, and compared the ChameleonMask to more traditional masks that are generally used in stage theater. One of the actors triggered this conversation by illustrating what he called "*mask work*". In a recent play he had seen, and which was based on a very violent theme, masks were used to dehumanize the actors – that is, they hid the actors' faces and face expressions – thus making the play tolerable to watch. This example evolved in the conversation below, with the same actor pointing out that traditional masks are "*dead*" (they take away emotions and expressions), but this one is "*alive*" since a remote face is live-streamed through it.

"As audience, you project meaning into this dead object. The mask is usually a dead thing. Now it is alive in a sense, but it is also dead because it is an iPad" (*K, Actor*)

"We wouldn't just want an artificial face to be this consciousness, it would even be a double consciousness, in a sense" (*A, Dramaturge*)

The distinction between qualities such as dead and alive was further elaborated by the dramaturge who drew on such differences to elaborate on how the ChameleonMask would influence the scene when the "human consciousness" gets uploaded to a screen, saying that it would be an "*artificial*" or a "*double*" consciousness, hence, pointing to a further complexity in how the actor would be experienced when mediated both through the ChameleonMask and then by being "uploaded" to another human being.

Interestingly, elaborating on these distinctions worked as a conceptualization that created a design oriented understanding of the specific action of an audience member picking up the mask, and what that would mean for how the particular scene would play out. This was the start of a number of practical explorations of similarities and differences of acting with a traditional mask ("a dead thing") and the ChameleonMask, and how its digital and interactive properties could be framed and used in developing the narrative.

4.2.1 Reconfiguring actors, audience and narrative. Issues concerned with entering the mask, through a sequence of actions that would be meaningful to audience members, led to more hands-on explorations of the ways the technical features of the ChameleonMask would influence these particular moments in the scene. Despite the fact that scene had been written before the workshop, considering these aspects resulted in the creative team's engagement with the scene in relation to three central dimensions of the performance: namely, *the narration, the audience and the actors*. The critical point articulated through this discussion was that by putting the mask on, audience members "*go from listening to and communicating with the face, to wearing the face*", thus becoming active characters in the story. Reflecting on this transition steered the discussion towards the possible consequences for the narrative perspective of this scene and for the design of the whole performance.

The transcription below, follows the moment when the director stood up to illustrate an imaginary audience member who finds the mask and notices someone talking to her through it.

"But as soon as the audience picks it up it becomes hard to understand what is actually going on, as soon

you get someone else's face as your face, who should then be the receiver of the face?" (*C, Director*)

"The actor being filmed, the audience member who puts it on, a third part who watches? ... That is very interesting to see, the combination with the face and the body, just like traditional mask work." (*K, Actor*)

"It all becomes a problem of narrative perspective, when you put on the iPad you want to embody that perspective and then you have this conflict between narrative and interaction which always exists in game, do you want to tell a story or do you want proper interaction ... And this move between the different perspectives becomes massively complicated to write" (*L, Actor*)

Envisioning the concrete interactions with the mask, and still reflecting on the reconfigurations of the actor previously outlined, drew attention to details of the relations between the actors, the mask and the audience that had not been envisioned when sketching the scene. As illustrated in the conversation above, this point does not merely concern the scene under scrutiny, but the overall narration in the performance. Addressing this question entails to deal with the contradictions of "telling a story" versus "participating in a game", and with the challenges of introducing such a shift in perspective in the middle of a scene. As noted, this becomes "massively complicated to write".

To sum up, thinking about the concrete actions of an audience member picking the mask up and wearing it transformed the creative team's understanding of the technology and of the performance as a whole. This section has illustrated i) the ways interweaving the ChameleonMask in the performance can reconfigure ways of acting and participating in it, and ii) the concerns to reflect on the consequences of "entering the mask" for the actors and audience members involved in a specific scene. The close connection between working out the scene and making sense of the mask constitutes a *design-oriented way to envision* of how properties of the technology shape certain actions in the scene and, thereby, create challenges to the narration and overall design of the performance.

4.3 Interacting with the mask

Conversations at the workshop unfolded at different levels, focusing on concrete challenges, such as what would happen to the dialogue when an audience member wears the mask, or more conceptual aspects – e.g. how the technology would reconfigure actor-audience participation or the narrative perspective in the performance. In the episode below, the conversation among the creative team foregrounds audience's interactions with the ChameleonMask and the (remote) actor displayed on the screen. In this exploration, the artists go back to idea of the "the blurred actor", whom the "iPad face" belongs to, and how interactions with it should be framed. One of the actors brought up questions on how audience members' interactions with the mask should be conceptually understood, that is whether audience members would have to engage in "proper interaction" with the performance – i.e. actually performing in the dialogue – or only be involved in a *proxy-style interaction*, as "carriers" or "vessels" acting on behalf of the remote actor. In other

words, should audience members be participants or observers of the interactions?

“If actors are playing and handling the faces and facial expressions then it is not proper interaction, could as well be scripted, massively more complex if the audience would be involved in proper interaction, or only carriers of these faces/stories, but that would be the actors’ role”. (*L, Actor*)

This conceptual, and fairly abstract reflection, is followed by the other actor’s suggestion of how such a question could be practically addressed by expanding the design of the mask as well as the narrative of the performance. His suggestion is that photographs could be taken of members of the audience when entering the performance space. These pictures could then be uploaded to the mask-face, thus enabling people to meet themselves in the performance. This would enable the audience to have an active role already in the beginning of the performance, but without the challenges of defining this role through explicit script writing. In this episode, the artists’ efforts of interweaving the ChameleonMask in the artistic production materialize both through *conceptual and conversational forms of design* and by devising *concrete design suggestions* for adaptation of the technology. Thus, envisioning how interaction would play out within a specific scene worked to conceptualize how the technology would reconfigure aspects of audience-participation, and push technical functionality of the ChameleonMask for the purposes of the performance.

Issues concerned with making audience members actively participate in the performance were recurrently discussed throughout the workshop with respect to aspects of script writing. In the conversation centered on the opening scene, the artists outline a number of problems with the dialogue in it. Coming back to fundamental questions of “who is talking to whom”, and considering “*how the tech actually works*” they raise concerns about the effectiveness of the dialogue in convincing audience members to put the mask on.

“Not decided if this text should include inviting the audience to participate, depends on a number of things” (*A, Dramaturge*)

“Who is talking to who in this text?” (*K, Actor*)

“The idea was that you had to put it on after the first sentence, but that does not really make sense with how the tech actually works” (*A, Dramaturge*)

“This points to potential narrative problem before we get to the point of interacting with the device/voice, and just become our minds ... or becoming only body when putting the mask on” (*L, Actor*)

As illustrated, one of the actors pointed out potential narrative problems stemming from interactions with the technical device. Interestingly though, these challenges were not perceived as problems to be solved. Later on, one of the actors suggested that the discrepancy of perspectives created by the mask – who is talking? whose body is it? and whose mind? – is what could make the scene and the performance intriguing.

Also in this case, what started as a *conversation about the conceptual challenges* created by the technology, evolved into a number of *concrete design proposals* to address such challenges – e.g. for example - to remove parts of the dialogue or changing narrative

perspectives in the story. Unpacking the consequences of the dialogue was conducted in close connection with considerations of the technology, and how it reconfigured the creative possibilities for a range of aspects, such as the design of audience participation and the detailed, sequential unfolding of the dialogue.

4.4 Acting with the mask

During the second day of the workshop, the artistic team decided to further investigate aspects of acting with the ChameleonMask, particularly how it feels and what the implications would be in setting up scenes where it would be used. Two main hands-on exercises were carried out as means to explore emotional, embodied and felt-like aspects of acting with the mask. The first exercise focused on clown acting: clowns usually wear a mask and their body language is defined by specific techniques that aim to a certain form of expressiveness. The second exercise was also centered on clowning techniques, but with the use of the ChameleonMask instead of a traditional one. Combined together, the two activities were important moments to make sense of the ChameleonMask and the ways it enables, or hinders, expressions and body language.

In the following episode, one of the actors introduced the clown exercise which, as we learned during the workshop, is commonly used to teach clown techniques in theater and acting classes.

“My task will be to walk in to the room, sit down on the chair, and say ‘hi’. I will have to follow the basic rules of clown technique which is that you always have to react to everything in the room, such as any sound, movement or laughter. Before you do anything you have to count to three - then sigh - then do the action. So if I am going to sit down, I have to count to three, and if something goes wrong, I have to repeat it three times. My idea now is that we do it with this half mask. I thought that I can do that, and then we can do the same exercise with the ChameleonMask, and then somebody has to be the body. We can do that without any words, and then perhaps we can do it with words. So, I go behind there, then I will come in, sit down, say hello, and then I will leave. Count to three before and after I do anything, and repeat mistakes three times, so it could take some time... I have to do one thing at a time. Enter the room, look at the room, look at the chair, face the chair, start to walk towards the chair, adjust my body, sit down, separate the movements” (*K, Actor*)

The enactment of this exercise (Figure 4) was an effective way of illustrating clown acting and a powerful experience for the rest of the workshop participants. Despite the lack of a real story, by following a system of basic rules to act with the mask, the actor performed an intriguing and comical character with a rich expressiveness. Following his performance, the team discussed various aspects of the acting that had just experienced, particularly a clown’s specific ways of looking and moving and the kind of audience experience that follows from that. As K described it, a clown only does one thing at the time and, to meet the audience, often follows with his whole torso when looking in a particular direction – this is to replace the lack of eye movements or facial expressions.



(a) Sitting on a chair

(b) Standing



(c) Sitting again

Figure 4: One of the actors performing the clown exercise while wearing a traditional theater mask.

4.4.1 Movement, body language and gaze. Following up, the clown exercise was carried out using the ChameleonMask (Figure 5). Also this turned out to be intriguing to the rest of the team, creating an unusual form of experience of a moving body acting with someone else's face. However, some important differences regarding how the various techniques of acting played out with the ChameleonMask were discovered. One of the first things that one in the team realized was that this mask is visually experienced "in the same manner as Mona Lisa, it will always look at you, no matter where in the room you go". This is perhaps not a surprising insight, but within the context of this particular technology exploration it had important consequences for their further design efforts.

The two mask exercises was the start of a broader exploration of aspects of movement, body language and gaze, in relation to acting with the ChameleonMask and how traditional mask acting techniques could be used in developing ways of acting that would work together with the ChameleonMask. In the conversation that followed L's performance of the clown exercise the team came back to the issue from the first day regarding the potentials for emotional expression and interaction using the ChameleonMask. In particular, the role of body language, movement and gaze were discussed. The director initiated this with a question of how it would be to play an aggressive character using the mask.



(a) Looking at the audience

(b) Saying Hi

Figure 5: The two actors performing the clown exercise with the ChameleonMask. The left image shows the surrogate actor looking at a potential audience. The right image shows the actor waving his hand to greet the people present.

"It is it is possible to be aggressive but the body needs to be slowly and very controlled, as soon as it is a little shaky, then we sort of loose the magic" (C, Director)
 "Ah, I see" (L, Actor) "So the magic is all those slow, (gesturing)" (C, Director)
 "And it's like the clown or the ... it works like it gives, it suddenly has a body that that we feel is very different from a normal body language" (C, Director)
 "Yeah" (L, Actor)
 "It's nice that it's somehow it's something about that it is an ipad, it's such a cold material thing, it's so nice that it's gentle (gestures)" (C, Director)
 "Yeah, that it's cursing or like something (moves hand slowly, folds down mask over face) I thought about these... do you get the feeling that I am ... supporting like this (puts hand under cheek) ... I don't know how it looks" (L, Actor)
 "Yeah, they work very well (gestures around face)" (C, Director)
 "So it has to be ... pretty flowy (moves gently forward) for you ... but all of these quick ones, then you loose that connection or is it that the angle is lost?" (L, Actor)
 "it's because then the face (gesturing) it's like and then you know you loose" (C, Director)

As also illustrated in (Figure 6), these conversations were concerned with the subtle ways to move one's own body when acting with the ChameleonMask. Examples include ways of circling the hands, a slight leg stretch, or a delicate lean to the side. As the surrogate character wears someone's else face through the mask, the team realized the importance to design embodied interactions that would make the communication between the surrogate and other participant (e.g. audience members) sensible and meaningful. While trying out different ways of gesturing and moving, the actor L explicitly asked for feedback on how such movements, that he defined as "slow", "pretty flowy", or "cursing". He also explicitly sought to understand breakdowns in such interactions and look for movements, such as quick ones, that did not work. As it was emphasized, slow and gentle movements would create a kind of

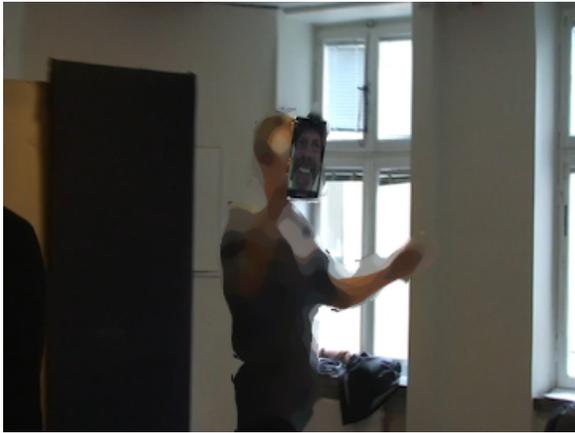


Figure 6: The surrogate actor exploring body movements, such as moving the arms in circles, while wearing the ChameleonMask

"magic" in the expressions, especially with the mask being a cold material thing".

To sum, by drawing on clown acting techniques and exercises to act with the interactive mask, the artists explored ways of *designing a body language* - e.g. controlled, gentle movements - that they thought would work with the technical qualities of the technology.

5 DISCUSSION

Particularly striking in our findings is how the efforts of the team and the professional skills they display in creating an artistic experience, work to make connection to issues of designing working sequences of interaction involving the mask, as well as about design-oriented considerations of the technical feature of the mask within the context of the production. The themes of our analysis thus served to illustrate how professional skills from acting and performance has important potentials for HCI to learn about how to approach the design of performance-led research and design processes. In what follows, we further address three issues stemming from the analysis. The *first* concerns the role of the artists' professional skills and expertise in creating design-oriented understandings of the ChameleonMask's role within the performance. The *second* regards the organization of the workshop around explorations of a high-fidelity, working prototype to be interwoven in the production of the performance. The *last* addresses the role of HCI researchers in the design activities analyzed and in performance-led research more broadly.

5.1 Artists' professional skills in performance-led research

The findings show the different levels at which the creative team engaged with the challenges and opportunities related to the appropriation of the ChameleonMask in the interactive performance. Concerns ranged from details of body language and gaze, that would make acting with the ChameleonMask a positive experience, to the narrative perspective of the whole production. Moreover, the team's explorations focused on aspects such as emotional expressiveness,

interactions between actors and audience members, elements of audience participation, and on how consolidated acting techniques (e.g. clown acting) were reconfigured by the technology. The artists' practical expertise and conceptual skills of producing, writing and acting in theater plays were paramount to these discussions. While they initially regarded the ChameleonMask as "merely an iPad", strapped onto ones face, investigating how it could be interwoven in the performance triggered discussions about its animated qualities - as the artists put it - as novel opportunities for their work.

The artists' engagement reflect a form of professional vision [12] that underlay their *design-oriented explorations* of making the interactive mask work within the frame of their creative visions. Drawing on an in-depth awareness of what their professional practices entail, enabled them to identify the expressive potentials of the technology, as well as the challenges it created - this last point resonates with previous research [1, 33]. The artists' approach to the integration of the ChameleonMask into the performance was not limited to supporting isolated functions. Their design and technological explorations tackled overarching aspects, such as script-writing, narration and the very role of actors in the performance.

5.1.1 Artists' and designers' skills. The ways the artists approached the challenges of incorporating the technology into the performance reflect various design skills. A significant instance was, for instance, *juxtaposing well-established acting techniques with acting with a digital mask*. This enabled the team to practically experience how acting with the mask could be perceived by audience members and, similarly to [10], envision ways to coordinate verbal and embodied interactions along with movements and gaze.

It would, however, be reductive to claim that theater skills would always work as what HCI regards as design expertise - at least in such settings. Rather, exploring how these two forms of expertise inform and define each other is an important issue for HCI and performance-led research to pursue, one which we articulate through two main points. The *first* regards the role of the narrative in framing the workshop discussions and the design explorations at large. While unpacking the work that the mask does to the whole performance guided the workshop, this question was always intertwined with various understandings of other aspects of the performance. For instance, explorations of the technology and the narrative always went hand-in-hand, suggesting that one could not be designed without the the other. Differently from other studies [1], technology was not regarded as an add-on to a completely designed performance. Our data provide examples of performance-led design work where *technology and narrative are co-constructed and shape each another*. The care and effort they put into designing the details of the performance at the point when audience members would move from being observers to becoming participants in the production provide an illustrative case of how artist skills and designer skills worked to co-construct the performance, and how the artists displayed a sensitivity to the interdependence between technology and elements and perspective of the narrative. The *second* aspect regards the artists' and HCI-researchers' sense of ownership of the workshop and its outcomes. As mentioned in the data collection, the workshop activities were planned together with the artists, while their working suggestions to explore the use of

traditional masks and clown-acting techniques were just embraced. The artists were not just invited to participate as stakeholders, or informants, in the context of a research project. On the contrary, they were co-owners and leaders of the workshop.

To sum, the processes described in the analysis intertwine the exploration of conceptual and technological aspects. This expands the notion of self-situated performance research [41] and how design largely becomes an issue of making sense of artists' actions, from a designerly point of view. In discovering opportunities with the technology, open-ended explorations of creative possibilities and practical concerns for implementable ideas go hand in hand. Through the processes of accommodating the mask to a novel context, and addressing possible consequences of its use, artistic and designerly expertise converge and mutually shape each other. The artists' skills and expertise have much in common with HCI design explorations, in that they entailed focused considerations of the human-mask reconfigurations – e.g. with respect to acting practices and key roles, consequences for audience participation, and for the overall experience of the performance. Such central design skills stem from the artists' professional visions (REF), specifically their consolidated, in-depth expertise and understandings of their practices. We argue that HCI needs to acknowledge such diverse ways to do design, and to move away from mere HCI research-driven collaborations and acknowledge the co-creation of methods, scopes and outcomes.

5.2 Designing with working prototypes

Within Interaction Design, it is generally assumed that design efforts should begin by opening up the design space [20], rather than nailing down, early on in the process, forms and functions of the technology. The workshop presented in this paper did almost the opposite by starting with a pre-existing, fully working prototype. This had a fundamental influence on the outcomes of the workshop. The most obvious consequence was that it made the discussion about its use sharp and concrete, with the creative team quickly engaging in productive conversations. In its most obvious sense, the workshop was technology-driven [26]. However, the design processes that unfolded were not technology-centric, but rather focused on the creative opportunities to design an intriguing performance with a novel technology. Both the conceptual and technological explorations drew on the artists' open-mindedness, and their ability to try out alternative ideas without fear of dead-ends, despite their practical concerns to develop a performance due to be premiered the following spring.

5.3 Artists leading design processes

As the empirical findings illustrate, most of the workshop's activities were driven by the artists. As the workshop progressed, the HCI researchers chose to take a less active role, letting the artists set and change the agenda and frame the design exercises – e.g. the clown acting exercise. To an extent, the workshop could have been carried out with the researchers as service staff, orchestrating the technology and making sure it worked, coordinating the different activities, or moderating the discussion – for instance, by asking question that would trigger further reflection or make the conversation move forward. We characterize this aspect as *design happening*

from within [40] the context of the performance, as opposite to design for a particular purpose.

Our study shows that design skills generally ascribed to design practitioners/experts were distributed among all the participants in the setting where design occurred. This opens to reconsiderations of the ways design activities are organized, the roles of different participants, and what should be expected from their participation. If skills and expertise concerned with opening up design spaces, envisioning the consequences of design decisions, and exploring (re)designs of technology are extensively mastered by people like the artists in this paper, what are the implications for HCI research?

Moving away from the view that developing new digital artifacts is the sole goal of expert HCI design, our case suggests a reconfiguration of HCI research where scouting for existing technologies, to be tailored and reappropriated in the context of artistic endeavors, is a core concern. While the technological explorations were specifically orientated towards the actual production, to see opportunities beyond what the technology was already designed for, the HCI researchers played a central role. This strategy can be useful for artists to deal with real-life constraints, such as production deadlines or budget limitations, and still explore creative possibilities early on – rather than adding a technological layer to almost finalized productions. Notably, the design workshop was part of a real production supposed to be premiered in the spring of 2021; This was probably the reasons' for the artists' solution-oriented attitude that compelled to deal with actual concerns of the final production.

Drawing attention to the artists' language to talk about the consequences of acting with the mask is indicative of what might constitute design knowledge that practitioners find relevant. Thus, rather than developing conceptualizations that might be relevant to academic endeavors, we argue that HCI research should develop ways and forms to bring research outcomes back to practitioners/artists. Outlining both what is interesting for research and for the purposes of artistic productions is paramount here. This, we argue, needs to be further unpacked in performance-led research to avoid conceptualizations and research outcomes that only help HCI research design, but not practitioners whose work becomes, ironically, emblematic of central HCI contributions to the area.

6 CONCLUSIONS

This paper has presented performance-led research processes that aimed at interweaving a telepresence technology into an interactive theater performance. The analysis has drawn attention to the artists' professional skills, particularly their ability to a) conceptualize and analyze the narrative of the performance in relation to the interactional opportunities of the technology, b) practically explore various acting techniques and the ways the ChameleonMask mask would shape them and c) explore the consequences of using the mask at various levels of design. The analysis has illustrated the artists' design-oriented understandings of the technology in developing the interactive performance. We have reflected on a number of issues regarding the ways HCI and performance-led research can conceive of this kind of knowledge and expertise as *designerly skills*. We have argued for their importance in developing new methods and approaches for research and design in this area.

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